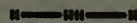


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1919/20

**REGISTER**  
**O F T H E**  
**BALTIMORE POLYTECHNIC**  
**INSTITUTE**



**1919-1920**



**ANNUAL REGISTER**

**OF THE**

**Baltimore Polytechnic  
Institute**

**200-240 EAST NORTH AVENUE**

---

*THIRTY-FIFTH ACADEMIC YEAR*

---

**1919 - 1920**



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## BALTIMORE POLYTECHNIC INSTITUTE

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### HISTORICAL SKETCH

The Baltimore Polytechnic Institute, a secondary technical school maintained by the City of Baltimore, was the first educational institution in the United States to establish manual training as a part of the course of a public school system.

Although it is believed that tentative efforts to ingraft manual training upon the City's school system were made as early as 1873, yet the action which led to the establishment of this school was not taken until April, 1883. At a meeting of the Board of Commissioners of Public Schools, held on the 23rd of that month, Mr. Joshua Plaskitt, Commissioner for the Ninth Ward, offered a resolution for the appointment of a committee "to consider the advisability of establishing a school or schools for manual training." The resolution was adopted, and the committee thus appointed recommended the establishment of a school "for manual education." The necessary enabling ordinances and enactments having been passed by the City Council of Baltimore and by the General Assembly of Maryland, the school was organized and opened on the Courtland Street site, on February 26, 1884, under the name of "Baltimore Manual Training School" with Dr. Richard Grady as Director.

In January, 1886, the faculty was reorganized, Lieutenant John D. Ford of the Engineer Corps of the U. S. Navy, who had been detailed for duty at the school, becoming Principal.

From the opening of the school applicants for admission had been required to pass through the eighth grade of the elementary schools, or to show satisfactory evidence of having had equivalent instruction; but in September, 1888, it was decided to admit pupils of the sixth, seventh and eighth elementary grades. This action opened the school to so large a number that increased accommodations became imperative;

and in June, 1890, a new building, devoted to the academic studies and drawing, was erected and occupied.

Lieutenant Ford was recalled to the naval service in June, 1890, and was succeeded as Principal by John W. Saville, a retired member of the Engineer Corps of the Navy.

In May, 1893, the name of the school was changed to "Baltimore Polytechnic Institute," and the titles of Principal and Vice-Principal were changed to President and Vice-President, respectively.

Mr. Saville resigned in August, 1899, and was succeeded as President by Lieut. William R. King, Engineer Corps, U. S. Navy, the present head of the school.

Early in 1900, a comprehensive and exhaustive report discussing the conditions, needs and aims of the school, and recommending certain changes in the requirements for admission and in the curriculum, was submitted to the Board of School Commissioners by the Board of Visitors, a body created by a provision in the new charter of the City of Baltimore, which went into effect on March 1st, 1900. The partial adoption of this report in September, 1900, excluded elementary school pupils from the Institute, thus making the requirements for admission the completion of the course prescribed for the elementary schools.

In May, 1902, the course was made, by action of the Board of School Commissioners, four years in length for all entries on and after September 15, 1902.

By operation of the new charter the titles of President and Vice-President were changed to Principal and Vice-President.

The enrollment becoming greater than the buildings on Courtland street could accommodate, School No. 46 on Division street was fitted as an annex in 1908, and in September of that year the first-year class was there accommodated.

In order to provide for the continued growth of the Institute, the City Council, by an ordinance approved April 19, 1909, directed the Mayor, the City Comptroller, and the President of the Board of School Commissioners to acquire by purchase the property on North Avenue then occupied by

the Maryland School for the Blind. That property, containing nearly six acres, was subsequently purchased for \$345,-000, and plans were instituted for the erection of a building to provide for an ultimate accommodation of 2,000 students, but the subsequent opening of Calvert street through the grounds compelled the modification of the plans to their present dimensions, which provided for the possible accommodation of 1,500 students.

The main building on the North avenue property having been altered in accordance with the architect's plans for the new Institute, the first-year class was moved there from the Division street annex on December 5, 1910.

On March 17, 1911, ground was broken on the North avenue site, and on September 22, 1913, the new building was occupied for the session of 1913-1914.

The enrollment becoming greater than could be accommodated in the North avenue building, part of School No. 74; Homewood avenue and Twenty-second street, was used as an annex, February 2, 1920.

**BOARD OF SCHOOL COMMISSIONERS**

---

JAMES W. CHAPMAN, Jr., *President*,  
JAMES M. DELEVETT,  
SIDNEY P. THANHOUSER,  
RICHARD J. BIGGS,  
ALBERT L. FANKHANEL,  
COL. CLARENCE DEEMS, U. S. A. (Retired),  
ARTHUR B. BIBBINS,  
JOHN H. FERGUSON.

---

**SUPERINTENDENT OF PUBLIC INSTRUCTION**

CHARLES J. KOCH.

**FACULTY**

---

WILLIAM R. KING, U. S. N. (Retired),  
Principal.

WILLIAM H. HALL, A. M.,  
Vice-Principal.

Head of Department of Science.

WILLIAM H. WILHELM, A. M.,  
Head of Department of Mathematics.

WILLIAM G. RICHARDSON, JR., M. E.,  
Head of Department of Engineering.

G. NORMAN ANDERSON,  
Head of Department of Practice.

PHILIP DOUGHERTY, A. M.,  
Head of Department of History and Civics.

GEORGE S. WILLS, A. M.,  
Head of Department of English and French.

MISS NETTIE E. CONLEY,  
Secretary.

MISS BERTHA J. KOLLMEYER,  
Clerk.

FACULTY AND STAFF BY DEPARTMENTS  
IN ORDER OF APPOINTMENT

---

DEPARTMENT OF ENGINEERING

W. G. RICHARDSON, Jr., M. E., *Head of Department.*  
SAMUEL P. PLATT,  
HENRY BOGUE, Jr., A. B.,  
WALTER SIMON,  
H. NELSON GAMBRILL,  
WALTER A. BROWN, M. E.,  
FRANK J. FAHM, C. E.,  
ROBERT A. REITZ, E. E.,  
HENRY P. RODGERS, M. E.,  
R. B. WATSON, A. B.,  
V. F. ROBY, C. E.

---

DEPARTMENT OF PRACTICE

G. NORMAN ANDERSON, *Head of Department.*  
W. G. RICHARDSON, Sr.,  
ALLAN B. SOUTHER, A. B.,  
CHARLES A. PETTIT,  
CYRIL H. A. MARKLEY,  
NATHAN FREEDMAN,  
WILLIAM J. HEIMILLER,  
WILLIAM D. O'KEEFE,  
J. D. CLARK,  
JOSEPH H. PUNTE,  
MELVIN L. MORITZ,  
A. K. GARDNER,  
H. MELE,  
J. P. MILLER,  
C. L. FREEMAN,  
F. L. FREEZE,  
G. T. BERTSCH.

**DEPARTMENT OF MATHEMATICS**

WILLIAM H. WILHELM, A. M., *Head of Department.*  
OLIVER BACHARACH,  
HARVEY S. HOUSKEEPER, A. B.,  
A. E. SABLE, A. M.,  
ALEXANDER C. ROBINSON, A. B.,  
ERNEST T. McNUTT, A. B.,  
CHARLES D. GREGORY, B. S.,  
J. RAYMOND CURTIS, A. M.,  
OTHO M. WHITMORE, A. M.,  
GEORGE A. VAIDEN, A. B.,  
HENRY E. SMITH,  
R. N. DEMPSTER, B. S.,  
ROBERT H. SHARPE,  
N. R. WARTHEN, B. S.,  
V. R. TRUITT, A. M.,  
J. L. ETTER, C. E.

---

**DEPARTMENT OF SCIENCE**

WILLIAM H. HALL, A. M., *Head of Department.*  
IRVING L. TWILLEY, A. M.,  
J. VINTON HOBBS,  
LUTHER B. MILLER, A. B.,  
EUGENE B. LINK,  
NORMAN L. CLARK, B. S.,  
J. A. JACKOWICK, A. B.,  
E. HOWARD ASKEW,  
CASIMIR MIKETTA, JR.

**DEPARTMENT OF HISTORY AND CIVICS**

PHILIP DOUGHERTY, A. M., *Head of Department.*

ISAAC L. OTIS, A. B.,  
CHARLES F. RANFT, A. M.,  
CHARLES E. ADAMS, Ph. B.,  
GEORGE W. WARD, Ph. D.,  
FRANK BOWERS, A. B.,  
JOHN M. DOOLEY, A. B.

---

**DEPARTMENT OF ENGLISH AND FRENCH**

GEORGE S. WILLS, A. M., *Head of Department.*

EDWARD REISLER, A. M.,  
ELMER M. HARN, A. M.,  
WILLIAM P. STEDMAN, A. B.,  
GEORGE H. SCHWARTZ, A. B.,  
HARRY P. PORTER, A. M.,  
HARRY L. CAPLES, A. B.,  
WILLIAM J. MILLER, A. M.,  
ERNEST R. SPEDDEN, Ph. D.,  
JOHN M. DOOLEY, A. B.,  
MEYER BROWN, B. S.,  
HERBERT E. FANKHANEL, B. S.,  
JAMES E. FLEAGLE, A. B.,  
HENRY F. FRANK, A. B.,  
KARL MELAMET, A. B.,  
BENJAMIN MICHAELSON, A. B.

## RECORD OF FACULTY AND STAFF

### ARRANGED IN ORDER OF APPOINTMENT

William R. King, Lieutenant, U. S. N., retired, U. S. N. A., 1875. Principal and Head of Department of Engineering, September 1, 1899; relinquished duties of Head of Department of Engineering, September, 1911.

William H. Hall, B. B. C., 1885; A. M., Washington College, 1906. Instructor in Department of Science, September 23, 1886; Head of Department of Science, September 13, 1899; Vice-Principal, January 1, 1912.

William G. Richardson, Sr., Instructor in Department of Practice, February, 1887.

Samuel P. Platt, Instructor in Department of Engineering, October 1, 1897.

Oliver Bacharach, B. C. C., 1897; Instructor in Department of Mathematics, April, 1898.

Irving L. Twilley, A. M., Washington College, 1892; Instructor in Department of English, September, 1903; transferred to Department of Science, June, 1904.

Edward Reisler, A. M., Western Maryland College, 1888; Instructor in Department of English, May, 1904.

Elmer M. Harn, A. B., Rock Hill College, 1892; A. M., Rock Hill College, 1895; Instructor in Department of English, July, 1904.

Isaac L. Otis, A. B., New York University, 1899; Instructor in Department of English, September, 1904; transferred to Department of History and Civics, September, 1906.

Allan B. Souther, B. S., Harvard University, 1897; Instructor in Department of Practice, October, 1905.

Harvey S. Houskeeper, A. B., Lehigh University, 1872; Instructor in Department of Mathematics, September, 1906.

Henry Bogue, Jr., A. B., Johns Hopkins University, 1900; A. M., Loyola College, 1915; Instructor in Department of Engineering, September, 1906.

George S. Wills, Ph. B., University of North Carolina, 1889; Ph. M., *ibid.*, 1896; A. M., Harvard University, 1898; Instructor of English, June, 1907; Head of Department of English and Modern Languages, September 1, 1911.

William H. Wilhelm, A. B. and B. S., St. John's College, 1893; A. M., *ibid.*, 1896; Instructor in Department of Mathematics, June, 1907; Head of Department of Mathematics, September, 1918.

William P. Stedman, A. B., Trinity College, 1905; Instructor in Department of English and Modern Languages, February 12, 1908.

Charles Frederick Ranft, A. B., Johns Hopkins University, 1902; Instructor in Department of History and Civics, June, 1908.

Philip Dougherty, B. S., Trinity College, 1907; A. M., Columbia University, 1909; Instructor in Department of History and Civics, June, 1908; Head of Department of History and Civics, September, 1912.

G. Norman Anderson, Pratt Institute, 1908; Instructor in Department of Engineering, September, 1908; Head of Department of Practice, September, 1919.

Alfred B. Haupt, B. C. C., 1906; A. B., Johns Hopkins University, 1909; Instructor in Department of Mathematics, October, 1909. Resigned, December 31, 1919.

George H. Schwartz, B. C. C., 1905; A. B., Johns Hopkins University, 1908; Instructor in Department of English and Modern Languages, September, 1910.

J. Vinton Hobbs, B. C. C., 1894; Instructor in Department of Science, February, 1912.

Charles E. Adams, B. C. C., 1898; Ph. B., University of Chicago, 1914; Instructor in Department of English, 1912; transferred to Department of History and Civics, June, 1912.

E. Howard Askew, Science Laboratorian, April, 1912.

Charles A. Pettit, B. P. I., 1903; Instructor in Department of Practice, June, 1912.

Harry Primrose Porter, A. B., Washington College, 1905; A. M., Columbia University, 1912; Instructor in Department of English and Modern Languages, August, 1912.

A. E. Sable, Cumberland Valley State Normal School, 1907; B. S. and C. E., Bucknell University, 1911; Instructor in Department of Mathematics, August, 1912.

H. L. Caples, M. S. N. S., 1900; A. B. Johns Hopkins University, 1908; Instructor in Department of English and Modern Languages, February, 1913.

George W. Ward, A. B., Western Maryland College, 1890; A. M., *ibid.*, 1893; Ph. D., Johns Hopkins University, 1897; Instructor in Department of History and Civics, June, 1913.

Walter Simon, B. P. I., 1913; Graduate Assistant in Department of Engineering, 1913; Instructor in Department of Engineering, September, 1918.

Cyril Markley, B. P. I., 1913; Graduate Assistant in Department of Practice, September, 1913; Instructor in Department of Practice, February, 1915.

Ernest R. Spedden, A. B., Dickinson College, 1904; A. M., *ibid.*, 1906; Ph. D., Johns Hopkins University, 1909; Substitute in German and History at intervals during the year 1913-1914; Substitute in Mathematics, September, 1914; Instructor in the Department of English and Modern Languages, September, 1915.

William J. Miller, A. B., Harvard University, 1893; A. M., *ibid.*, 1896; Instructor in German, September, 1913; Instructor in the Department of English and Modern Languages, September, 1918.

Luther B. Miller, B. C. C., 1909; A. B., St. John's College, 1913; Substitute Instructor in B. P. I., 1914-1916; Instructor in Department of Science, September, 1916.

Alexander C. Robinson, A. B., Pacific University, 1910; Instructor in Department of Mathematics, September, 1915.

Ernest T. McNutt, A. B., Western Maryland College, 1898; Instructor in Department of Mathematics, September, 1915.

Eugene B. Link, B. P. I., 1912; Graduate of Student's Engineering Course, Westinghouse Electric and Manufacturing

Company, 1915; Instructor in Department of Science, October, 1916.

Charles D. Gregory, B. S., Wake Forest College, 1916; Instructor in Department of Mathematics, December, 1916.

G. Nelson Gambrill, B. P. I., 1909; Instructor in Department of Engineering, September, 1917.

Joseph A. Jackowick, A. B., Lebanon Valley College, 1917; Instructor in Department of Mathematics, September, 1917; Instructor in Department of Science, September, 1919.

Norman N. Freedman, B. P. I., 1917; Graduate Assistant in Department of Practice, 1917; Instructor in Department of Practice, May, 1918.

William G. Richardson, Jr., B. P. I., 1911; M. E., Lehigh University, 1914; Instructor in Department of Engineering, January, 1918; Head of Department of Engineering, 1919.

Walter A. Brown, B. P. I., 1911; M. E., Cornell University, 1915; Instructor in Department of Engineering, February, 1918.

Frank Fahm, Jr., B. P. I., 1909; C. E., Lehigh University, 1912; Instructor in Department of Engineering, February, 1918.

John M. Dooley, A. B., Western Maryland College, 1911; Instructor in the Department of English and Modern Languages, May, 1918.

Edgar A. Morgan, A. B., University of Illinois, 1906; Instructor in the Department of History and Civics, July, 1918. Resigned February 1, 1919; reappointed, July, 1919.

Meyer Brown, B. S., Johns Hopkins University, 1918; Substitute instructor in the Department of English and Modern Languages, September, 1918; Instructor in the Department of English and Modern Languages, November, 1918.

George A. Vaiden, A. B., Bethany College, 1908; Instructor in the Department of Mathematics, September, 1918.

Otho M. Whitmore, A. B., Randolph-Macon College, 1903; A. M., ibid., 1904; Instructor in the Department of Mathematics, September, 1918.

J. Raymond Curtis, A. B., Rock Hill College, 1910; A. M., *ibid.*, 1912; Instructor in the Department of Mathematics, September, 1918.

Henry E. Smith, Vermont Academy, 1888; Instructor in Department of Mathematics, September, 1918.

William D. O'Keefe, B. P. I., 1918; Graduate Assistant in Department of Engineering, September, 1918; Instructor in Department of Engineering, September, 1919.

Melvin Leroy Moritz, B. P. I., 1918; Graduate Assistant in Department of Practice, September, 1918.

Joseph H. Punte, B. P. I., 1918; Graduate Assistant in Department of Practice, 1918:

Norman L. Clark, B. S., Maryland State College, 1912; Principal Newport News High School, 1913; Instructor in Department of Science, October, 1918.

Robert A. Reitz, B. P. I., 1914; E. E., Lehigh University, 1916; Instructor in Department of Engineering, October, 1918.

Henry P. Rodgers, B. P. I., 1914; M. E., Lehigh University, 1916; Instructor in Department of Engineering, October, 1918.

W. J. C. Heimiller, B. P. I., 1912; Substitute Instructor in Department of Engineering, October, 1918; Substitute Instructor in Department of Practice, October, 1919.

Frank Bowers, A. B., Western Maryland College, 1913; Instructor in the Department of Mathematics, November, 1918; transferred to the Department of History and Civics, July, 1919.

Harry F. Frank, A. B., Johns Hopkins University, 1917; Substitute Instructor in the Department of History and Civics, February, 1919; Substitute Instructor in the Department of English and Modern Languages, July, 1919.

James E. Fleagle, A. B., Western Maryland College, 1909; Instructor in the Department of English and Modern Languages, July, 1919.

Vivian Roby, B. S., Maryland State College, 1912; Instructor in the Department of Engineering, September, 1919.

R. H. Sharpe, M. E., Cumberland Valley State Normal School, 1894; B. D., Princeton Theological Seminary, 1892;

Instructor in the Department of Mathematics, September, 1919.

Roland N. Dempster, B. P. I., 1914; B. S., Johns Hopkins University, 1918; Instructor in the Department of Mathematics, September, 1919.

Herbert E. Fankhanel, B. S., St. John's College, 1919; Instructor in the Department of English and Modern Languages, September, 1919.

Karl Melamet, A. B., Johns Hopkins University, 1916; Instructor in the Department of English and Modern Languages, September, 1919.

R. B. Watson, B. P. I., 1917; A. B., University of California, 1918; Instructor in the Department of Engineering, September, 1919.

Carroll L. Freeman, B. P. I., 1919; Graduate Assistant in the Department of Practice, September, 1919.

Frank L. Freeze, B. P. I., 1919; Graduate Assistant in the Department of Practice, September, 1919.

Alan K. Gardner, B. P. I., 1919; Graduate Assistant in the Department of Practice, September, 1919.

Hugo Mele, B. P. I., 1919; Graduate Assistant in the Department of Practice, September, 1919.

Casimir Miketta, B. P. I., 1919; Laboratory Assistant, Department of Science, September, 1919.

Nettie Elizabeth Conley, Sharptown High School, 1917; Goldey College, 1918; Secretary, October, 1919.

Bertha J. Kollmeyer, W. H. S., 1912; Clerk, October, 1919.

J. P. Miller, B. P. I., 1919; Graduate Assistant in the Department of Practice, October, 1919.

George T. Bertsch, B. P. I., 1919; Graduate Assistant in the Department of Practice, November, 1919.

J. L. Etter, C. E., Lehigh University, 1917; Substitute Instructor in the Department of Mathematics, January, 1920.

J. D. Clark, B. D., Providence University, 1900; Substitute Instructor in the Department of Practice, February, 1920.

Vaughn Rue Truitt, A. B., Washington College, 1907; A. M., ibid., 1910; Substitute Instructor in the Department of Mathematics, February, 1920.

George L. Darley, B. P. I., Mid-Year, 1920; Graduate Assistant in the Department of Practice, February, 1920.

Benjamin Michaelson, A. B., St. John's College, 1912; Instructor in the Department of English and Modern Languages, February, 1920.

Nathan R. Warthen, B. S., Maryland State College, 1912; Instructor in the Department of Mathematics, February, 1920.

**CALENDAR, 1919-1920**

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September 15, 1919, Monday.....	Opening of Session
November 14, Friday.....	First Quarter Ends
November 17, Monday.....	Second Quarter Begins
November 27, Thursday.....	Thanksgiving Day
December 24, Wednesday.....	Christmas Vacation Begins
January 5, 1920, Monday.....	Session Resumed
January 30, Friday.....	Second Quarter Ends
February 2, Monday.....	Third Quarter Begins
March 26, Friday.....	Third Quarter Ends
March 29, Monday.....	Fourth Quarter Begins
April 2, Friday.....	Easter Vacation Begins
April 6, Tuesday.....	Session Resumed
May 14, Friday.....	Annual Examinations Begin
May 30, Sunday.....	Decoration Day
June 16, Wednesday.....	Commencement Day
September 13, Monday.....	Opening of Session
November 12, Friday.....	First Quarter Ends
November 15, Monday.....	Second Quarter Begins
November 25, Thursday.....	Thanksgiving Day
December 24, Friday.....	Christmas Vacation Begins

## COURSE OF STUDY AND GENERAL STATEMENT OF PLAN AND PURPOSE

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The primary aim of the Institute is to give its students something more than fundamental instruction in applied science. It aims to prepare for intelligent service in the engineering professions—the professions to which the world is indebted for all the conveniences of life and for the economic production of its necessities.

The course of study is designed to accomplish the following purposes :

1. To give a sound fundamental practical education to students whose inclinations and circumstances preclude a college course.
2. To give to youth that healthful and highly valuable manual training which broadens education and conduces to dexterity, contrivance and invention.
3. To give to students in the third and fourth years such studies in Engineering, Mathematics, Physics, Chemistry, and such practical exercises at the machine, bench and in laboratories as will fit them:

(a) For immediate and remunerative employment in the wide field of civil, mechanical, electrical, chemical and mining engineering, where their training will lead to rapid advancement.

(b) For entrance to advanced standing into higher institutions of technology, should a higher technical education be desired.

That these objects are being attained is abundantly proved by the experiences of the graduates who enter immediately into the activities of engineering life, and by the fact that those graduates who enter higher institutions are invariably received to at least one year of advanced standing in the courses leading to the engineering degrees.

For the attainment of the objects of the course there is one carefully planned course of study, no effort being made to specialize until the fourth year, by which time a student will have acquired a considerable degree of practical skill and intimate knowledge in some one of the professions based on mechanical art and applied science that he may have elected to follow. Thus, in the fourth year in the subject of Design, the student may select examples of mechanical, electrical or civil engineering designs, the amount of such practice being limited only by the capacity of the student and the time available. Extra opportunities in the laboratories are offered advanced students for more extended investigations than those demanded by the course.

No attempt is made to teach trades, but the equipment is of such nature that the instruction given in the shops necessarily results in the acquirement of a considerable degree of manual dexterity, though designed to be correlative to the work in the class room. It is believed that instruction in correct methods of using tools and practical illustrations of how, and for what purpose, things are done, are of more value than mere excellence in hand skill.

In the department of English and French, instruction in English is given throughout the four years, and in French throughout the first three. The course in English comprises the theory and practice of composition, and the reading and study of selections from representative British and American authors, including the college entrance requirements. The work in composition is designed to give the student a practical knowledge of the ordinary forms of discourse and to train him in expressing his thoughts with ease and accuracy. To this end he is given frequent exercise in writing, the subjects, for the most part, being taken from his daily experience and from his work in the other departments of the school. The course in literature is designed, not only to meet the college entrance requirements, but to cultivate in the student such tastes as will lead him in his reading to choose books that are worth while.

The course in French comprises drill in the fundamental principles of grammar, and as wide a reading in selected texts as is possible. The course is not designed to give a speaking knowledge of the language, but such knowledge as will enable the pupil to read French easily, and successfully to pursue advanced courses in the study of the language.

In the department of History and Civics, instruction is given during the first and second years. The course includes about one-half of the work prescribed by the Committee of Seven, the first year being devoted to English History, and the second year to American History and Civics.

In Mathematics, care is taken at the beginning of the first year to discover and correct defects in fundamental training, after which the course of instruction proceeds in Algebra, Geometry, Trigonometry, Analytic Geometry, Descriptive Geometry and the Differential and Integral Calculus.

In the Department of Science, the work of the second year in Physics is the regular high school course, consisting of class room instruction and individual work in the laboratory, the laboratory practice being, as far as possible, conducted so as to permit all the students to perform the same experiment simultaneously. The Physics of the third year is more advanced and is really of college grade, the mathematical laws and derivation of formulas being prominent features. The laboratory work for this year is of a higher grade, but the experiments are not performed simultaneously, the expensive nature of the apparatus limiting the equipment to one set for each experiment. The apparatus for laboratory work in Physics is about the same as would be found in any well-equipped high school, with the addition of some pieces of better grade, such as a spectrometer, with micrometer scale; diffraction gradings; linear expansion apparatus; siren and other apparatus for study of sound. The tables are connected to gas supply and have conductors leading to the switchboard in the electrical laboratory, where connections may be made to supply current of any nature or voltage, all tables in this laboratory being connected, however, to the same supply at one time.

Electricity is treated as a distinct branch in the third and fourth years. The work of the third year is chiefly theoretical, the fundamental laws and principles being given careful consideration with the object of laying the foundation for practical applications in the fourth year. The laboratory work of the third year consists of tests tending to familiarize the student with the apparatus and especially with making connections according to diagram and with the proper interpretation of results. The work of the fourth year in electricity is of a commercial and practical nature. The direct current generator and motor are studied systematically, experimental determination of losses and efficiencies being emphasized. Commercial lighting, especially modern systems, is given a prominent place. The electric railway, including line and car equipment, is given about three weeks' time, which is sufficient for the essentials. The latter part of the fourth year is devoted to the study of alternating current generators, motors, and transmission and distribution.

The theory of the transformer is discussed, experiments are performed to illustrate its action, tests made for losses, and efficiencies at various loads calculated, all of which is followed by a general discussion of its action under varying conditions.

The equipment for this work is partly in the Mechanical Laboratory, the main switchboard and the generators being especially adapted to experiment. This board is about twenty-five feet in length and has four generator panels, one meter panel, two motor panels, two lighting panels, one alternating current break-down panel, a gauge panel, and two brackets for voltmeters. All necessary instruments, switches and circuit breakers are supplied. The meter panel may be connected to any circuit, and provides apparatus for the measurement of voltage, current, power and total energy. The lights of the building or any set of motors in the shops may be used as the load, or a water rheostat may be used independently. Each circuit is provided with a shunt, so that any meter may be connected across it, thus avoiding unnecessary duplication of instruments. The switchboard in the Electrical Laboratory is constructed on the plan of the old

style series lighting boards, thus permitting the connections from any source of power to any table or class room. Three-wire, 220-110 volts, direct current, is supplied from the power plant of the Institute. Outside current, three-phase, 110 volts, is also connected to this board. A 2 k. w. rotary converter, operated as an inverted rotary, is so connected as to supply three-phase current, 60 cycles, when connected to the direct current supply. A 3 H. P. Wagner motor, 220 volts, is arranged to drive a 2 k. w. direct current generator, giving 110 volts. These two sets make the Electrical Laboratory practically free from interruption due to the failure of either the Institute plant or the outside supply. A motor-generator set transforms alternating current to 25 volts direct. A mercury arc rectifier transforms alternating current to about 90 volts direct. The storage battery contains 26 chloride accumulators, giving a maximum of about 52 volts, and any lower voltage desired. This battery supplies current for the fire alarm system, the program bells, and for the telephones, and is used for battery supply to all tables requiring low voltage or study current. Apparatus is provided for tests for lamp resistance, candle power and efficiency, insulation resistance, line faults, permeability of iron and steel, transformer losses, instrument calibration, and other similar experiments. The newest and best methods of telegraph and telephone construction are presented, a wireless telegraph of the Marconi type being part of the equipment.

The study of Chemistry is carried through one-half of the third year and through the fourth year, the regular high school course, with laboratory practice, continuing through the first half of the fourth year. The latter half of the fourth year is devoted to qualitative analysis. The substances to be tested are graded, solutions being given at first, followed in logical order by soluble powders and insoluble solids. The laboratory tables are of a standard type, supplied with water and gas, and with waste connections. The table of each student is connected to an exhaust chamber for removing objectionable gases. The balances are located in a separate balance room,

there being six of these instruments, all of good quality and high accuracy.

In the department of Engineering the instruction given the fourth year students in theoretical and applied mechanics embraces the laws of equilibrium and of motion; center of gravity; friction; principles of work; moment of inertia; mechanics of materials; graphic methods of determining stresses in beams and in framed structures; and a study of the stresses and deformations produced in standard specimens of metal when subjected to tension, compression, torsion and shearing. The work of the third and fourth year students in steam engineering consists of the study of the thermodynamics of the steam engine in a manner as comprehensive as their maturity permits. Numerous calculations are made involving engine and boiler efficiencies and proportions, and the study of the indicator is supplemented with practice in taking diagrams, from which the consumption and distribution of the steam and the power of the engine are determined. The advantages and disadvantages of the different kinds of steam engines and boilers are studied, particular attention being given to engine and boiler, attachments and accessories. A study of valve motion with the aid of the Zeuner diagram, and a study of the important modern methods of governing engines, as well as a brief study of the steam turbine, are all included in the course.

The work of the fourth year in gas engineering consists of a study of the modern types of internal combustion engines. The methods of producing the fuels, of preparing and igniting the charge, and of governing the engine are studied in succession.

The work of the fourth year in mechanical laboratory practice consists of thirty-six comprehensive tests designed to supplement the class-room work in engineering subjects.

The plant for all this work consists of a 100 k. w. turbo-generator, a 100 k. w. Corliss driven generator, a 100 k. w. generator driven by a Buckeye cross compound engine (in course of construction by the students), a 25 k. w. generator driven by a high-speed automatic cut-off engine (Harrisburg

Standard), an inverted triple expansion marine engine of 100 I. H. P., an inverted compound marine engine of 60 I. H. P., a horizontal Atlas engine of 25 I. H. P., a 30 H. P. gasoline engine of the Autocar type, a 20 H. P. Otto gas engine and producer plant, two Keeler boilers of 175 H. P. each, and a Roberts safety water tube boiler capable of generating steam for the production of 120 I. H. P. when used in connection with the triple expansion engine. The compound and triple expansion engines may be worked singly or together in connection with a friction dynamometer specially designed at the Institute, an internal circulation of water in the brake wheel enabling the engines to run continuously in making power tests. Five of the engines were built by the students, including the two marine engines, which were designed at the Bureau of Steam Engineering of the Navy Department.

Grouped in the mechanical laboratory are all the engines, the gas producer plant, a steam-engine-driven air compressor, a steam pump, an air pump, two surface condensers, a water motor, a weir tank and well, weighing tanks, a measuring tank, a modern testing floor, a Riehle torsional testing machine capable of testing specimens up to five feet in length and of one and one-half inches in diameter, a Riehle oil testing machine capable of measuring friction to the extent of 500 pounds, and a Riehle testing machine for tension and compression of 50,000 pounds capacity. There are also steam, gas and coal calorimeters; apparatus for the thermal efficiency tests of steam traps, injectors and pumps; and apparatus for calibrating pressure gauges, thermometers, and indicator springs. Exhaustive engine, boiler, compressor, and turbine tests for power and efficiency are made by squads of fifteen of the senior class, the results of which are recorded in standard forms and retained by the students.

In the mechanical drawing rooms are 280 tables of approved designed, and an equipment of instruments and models well adapted to the requirements of an advanced course in the subject. Third year students are required to make a free-hand sketch of the parts of some machine, from which a fin-

ished drawing, tracing, and blue print are made. The work of the fourth year students in design tends to make them draftsmen in the true sense—not mere copyists.

The equipment in the machine, pattern, forge, sheet metal, and carpentry shops, is equal to that of any similar institution in the country.

## THE COURSE OF INSTRUCTION IN DETAIL

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The course extends through a period of four years of 36 effective weeks of instruction each.

*Students completing the full course of the Institute invariably obtain full sophomore standing, with some sophomore credits in the courses leading to the degrees of C. E., M. E. and E. E., at the leading technical universities of the country.*

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### DEPARTMENT OF ENGINEERING AND APPLIED MECHANICS

#### FIRST YEAR COURSE—D CLASS

*Mechanical Drawing.*—36 weeks, 4 periods a week:  
Use of instruments; lettering; elementary lessons.

#### SECOND YEAR COURSE—C CLASS

*Mechanical Drawing.*—36 weeks, 4 periods a week:  
Hatching; neatness and accuracy; scale drawing; intersection and development of surfaces.

#### THIRD YEAR COURSE—B CLASS

*Steam Engineering.*—36 weeks, 4 periods a week:  
Types of boilers; boiler details; boiler room auxiliaries; the steam engine; engine details; indicating and governing; governors; valves; condensers; multiple expansion engines; theories of heat; thermodynamics; properties of perfect gases; properties of saturated steam; use of steam tables; combustion of fuel and steam generation; boiler and engine efficiencies; the engine mechanism; slide valve and link motion; duty and efficiency of pumps.

*Mechanical Drawing.*—36 weeks, 4 periods a week:  
Detail drawings of machines from free-hand sketches; the working drawing, tracing and blue print; isometric projection; perspective drawing.

## FOURTH YEAR COURSE—A CLASS

*The Steam Engine.*—22 weeks, 3 periods a week:

The indicator and indicator diagram; measurement of power and of steam consumption; expansion of perfect gases and steam; the ideal and actual engine; engine and boiler design; valve diagrams; engine and boiler testing; the steam turbine.

*The Internal Combustion Engine.*—14 weeks, 3 periods a week:

Fuels, carburetors, vaporizers; ignition; cooling; lubrication; governing; indicator cards; efficiency; management; operation; defects and remedies; types of engines; gas producers.

*Mechanics.*—18 weeks, 5 periods a week:

Kinematics: Motion in a straight line with constant velocity and with constant acceleration; velocity and acceleration curves; vectors; resolution and composition of displacements, velocities, and accelerations; relative motion; acceleration with variation in direction of velocity; angular motion.

Dynamics: (a) Statics: The parallelogram, triangle and polygon of forces; a composition and resolution of forces; friction; the inclined plane; the screw; parallel forces; moments of forces and of couples; conditions of equilibrium; method of sections; equilibrium under the action of three forces; centre of gravity. (b) Kinetics: The laws of motion; inertia, mass, weight, momentum; work; power, potential and kinetic energy; centrifugal and centripetal forces.

*Mechanics of Materials.*—18 weeks, 5 periods a week:

Stress, strain, elastic limit, ultimate strength; calculations involving bending and resisting moments, moment of inertia, radius of gyration, deflection; resilience; bending moment and shear diagrams; design of beams, columns and shafts.

Graphic methods of determining stresses in beams and framed structures by means of the funicular polygon and reciprocal diagram.

Mechanics of Machinery: Transmission of power by means of belts and toothed gears.

*Machine Design.*—18 weeks, 4 periods a week:

Proportioning of machine parts, such as spur, bevel and worm gearing, belt pulleys and bearings, from empirical and rational formulas. The application of the mechanics of materials to the design of some part of an engine or tool, such as a traveling crane, cylinder, connecting rod, valve, screw jack. The application of graphic statics to the design of roof trusses and bridge members.

*Descriptive Geometry.*—18 weeks, 2 periods a week:

Projections of points, lines and solids; tangent planes, double curved surfaces of revolution; sections; intersections; developments.

*Surveying.*—18 weeks, 2 periods a week:

Instruments and their uses, laying off buildings; railroad curves; grades; topography; estimates.

*Engineering Laboratory.*—18 weeks, 4 periods a week:

Tension, compression, bending and torsion tests of materials; calibration of pressure gauges, thermometers and indicator springs; practice with planimeters; calorimeter tests for quality of steam; calorific value of coal and gas; valve setting; determining clearances; duty of steam pumps; indicated steam consumption of engines; economy tests of steam and gas engines, air compressors, boilers, producer plant, water motors, pumps and steam traps; testing oils for coefficient of friction, viscosity, flash point and burning point.

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### DEPARTMENT OF PRACTICE

#### FIRST YEAR COURSE—D CLASS

- (a) Carpentry; 18 weeks, 4 periods a week:  
Lectures and exercises in laying out, cutting, framing and joining wooden members.
- (b) Sheet Metal; 18 weeks, 4 periods a week:  
Lectures and exercises in soldering, and in sheet metal and venetian iron work.

#### SECOND YEAR COURSE C CLASS

- (a) Carpentry; 5 weeks, 4 periods a week:  
Review of the work of the first year.
- (b) Pattern Making; 13 weeks, 4 periods a week:  
Exercises in wood turning and in making simple patterns.
- (c) Forge Work; 18 weeks, 4 periods a week:  
Forging, welding, tempering and casehardening.

#### THIRD YEAR COURSE—B CLASS

- (a) Pattern Shop; 18 weeks, 4 periods a week:  
Exercises in making patterns for wrenches, pulleys, eccentrics, pillow-blocks, globe valves, pipe joints and core boxes where necessary. Lectures on construction and finish of patterns, on the different kinds of molding, and on the operation of the cupola.
- (b) Machine Shop; 18 weeks, 4 periods a week:  
Work on the lathe, drill-press and shaper; also chipping, filing and pipefitting.

## FOURTH YEAR COURSE—A CLASS

*Machine Shop Practice.*—18 weeks, 4 periods a week.

Machine work involving accuracy and finish, such as gear cutting, building and assembling of machinery.

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## DEPARTMENT OF MATHEMATICS

## FIRST YEAR COURSE—D CLASS

*Algebra.*—36 weeks, 4 periods a week:

Definitions and notation; fundamental operations; integral linear equations; factoring; highest common factor; least common multiple; fractions; fractional equations; simultaneous linear equations; graphical representation; inequalities; involution; evolution; theory of exponents; surds; quadratic equations.

*Geometry.*—36 weeks, 3 periods a week:

Geometry of the straight line and circle; proportion; properties of similar figures; original exercises.

*Explanation and demonstration.*—36 weeks, 1 period a week:

The most difficult and important features of the course are explained and demonstrated.

## SECOND YEAR COURSE—C CLASS

*Algebra.*—36 weeks, 3 periods a week:

Review; theory of quadratic equations; variables and limits; indeterminate equations; ratio and proportion; logarithms; variation; arithmetical, geometrical and harmonic progressions; binomial theorem; undetermined coefficients.

*Geometry.*—18 weeks, 3 periods a week, and 9 weeks, 4 periods a week:

Areas and volumes; lines and planes in space; polyhedrons; cylinder; cone; sphere; original exercises.

*Trigonometry.*—9 weeks, 4 periods a week:

Functions of the acute angle; the right triangle; use of tables; functions of any angle; relations between the functions of several angles; inverse trigonometric functions.

## THIRD YEAR COURSE—B CLASS

*Trigonometry.*—18 weeks, 3 periods a week:

General formulas; the oblique triangle; miscellaneous examples.

*Analytic Geometry.*—36 weeks, 4 periods a week:

The straight line; circle; parabola; ellipse; hyperbola; transformation of co-ordinates; construction of loci; higher plane curves.

*Review.*—18 weeks, 2 periods a week.

## FOURTH YEAR COURSE—A CLASS

*Differential and Integral Calculus.*—36 weeks, 5 periods a week:

Differentiation of algebraic and transcendental functions; successive differentiation; expansion of functions, including the development of Maclaurin's and of Taylor's theorems; evaluation of indeterminate forms; maxima and minima of functions of one variable, including geometric problems in maxima and minima; differentiation of functions of more than one variable; radius of curvature; tangents and normals; derivatives of arcs; fundamental rules and methods of integration; geometrical application of the calculus to lengths of curves, to areas, to volumes of solids of revolution; integration of trigonometric functions; successive integration; application to mechanics.

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## DEPARTMENT OF SCIENCE

## SECOND YEAR COURSE—C CLASS

*General Physics.*—36 weeks, 4 periods a week:

During this year the regular high school course in physics is given, omitting electricity, which is studied later in the course. Derivation of formulæ and the solution of problems are required. Emphasis is laid upon such sections as have reference to engineering courses. Experimental demonstration by the instructor is made whenever the subject permits. Two periods a week are devoted to individual work in the laboratory during the last half of the year.

## THIRD YEAR COURSE—B CLASS

*Electricity.*—36 weeks, 3 periods a week:

Magnetism; galvanometers and other measuring instruments; laws of electrical action; magnetic and electrical units; simple alternating currents; derivation of formulæ and practical problems; experimental demonstration by the instructor; individual laboratory work in electrical measurements.

*General Physics.*—18 weeks, 3 periods a week:

The work in physics is confined principally to advanced study of light and sound, the subjects of dynamics and heat being embraced in the work of the Department of Engineering.

*Chemistry.*—18 weeks, 3 periods a week:

General chemistry with experimental work by the instructor, showing the preparation and reactions of the elements and compounds. Individual work in the laboratory.

#### FOURTH YEAR COURSE—A CLASS

*Electricity.*—36 weeks, 4 periods a week:

Applied electricity, including electro-chemical action; principles of the generator, motor and transformer; railways; line and machine testing; telegraph and telephone; electric lighting. One period a week is devoted to individual laboratory work in measurements, practical testing and the operation of the generator, motor, and transformer.

*Chemistry.*—36 weeks, 4 periods a week:

General Chemistry: This is a continuation of the work of the third year and is followed for the first half year, making a full year for general study of the subject.

Anlytic Chemistry: A course in qualitative analysis of solutions and powders, the latter half of the fourth year being allotted to this work. Writing reactions and the significance of solubility and color are made prominent. Calculations depending upon chemical relations are especially emphasized. Several quantitative determinations are also required.

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#### DEPARTMENT OF ENGLISH AND FRENCH

##### FIRST YEAR COURSE—D CLASS

*Composition and Rhetoric.*—36 weeks, 2 periods a week:

Study of text-book and frequent written exercises based upon Narration and Description; letter writing.

*Literature.*—36 weeks, 3 periods a week:

(a) Study of the following selections: Sketch Book; Snow Bound, Tales of the White Hills; Poems and Tales from Poe; Sir Launfal; Lady of the Lake; Ivanhoe.

(b) Leading facts in the lives of the authors represented in (a).

*French.*—36 weeks, 4 periods a week:

Study of the grammar, and reading easy prose.

**SECOND YEAR COURSE—C CLASS**

*Composition and Rhetoric.*—36 weeks, 2 periods a week:

Frequent written exercises; study of rhetorical principles, with special emphasis upon Exposition and Argumentation.

*Literature.*—36 weeks, 2 periods a week:

(a) Study of the following selections: Ancient Mariner; Vicar of Wakefield; Deserted Village; Silas Marner; DeCoverley Papers; Merchant of Venice.

(b) Leading facts in the lives of the authors represented in (a).

*French.*—18 weeks, 4 periods a week; and 18 weeks, 3 periods a week:

Composition; grammar; reading standard French prose and an outline of the history of France, in French.

**THIRD YEAR COURSE—B CLASS**

*Literature and Composition.*—18 weeks, 2 periods a week; and 18 weeks, 3 periods a week:

Study of the following texts: Julius Cæsar; Macbeth; Milton's L'Allegro, Il Penseroso, Lycidas, and Comus; or selections from Tennyson's Idylls of the King; Burke's Speech on Conciliation. Frequent written exercises.

*French.*—36 weeks, 3 periods a week:

Review of grammar and composition; copious reading in prose and poetry.

**FOURTH YEAR COURSE—A CLASS**

*Technical Composition.*—36 weeks, 1 period a week:

Methods of exposition, and drill in the writing of business letters and in different forms of engineering writing. Conferences with the instructors.

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**DEPARTMENT OF HISTORY AND CIVICS****FIRST YEAR COURSE—D CLASS**

*History.*—36 weeks, 5 periods a week:

English History from its beginning to the present day. Especial attention is given to the social, economic, and political phases of the subject; and as far as time and maturity of the pupils permit, attention is directed to the development of Europe as it progressed contemporaneously with England.

**SECOND YEAR COURSE—C CLASS**

*History and Civics.*—36 weeks, 4 periods a week:

American History, with special attention to political development; civil government of the United States and the rights and duties of American citizenship.

## BALTIMORE POLYTECHNIC INSTITUTE

## TIME DEVOTED TO THE DIFFERENT SUBJECTS COMPRISING THE FOUR YEAR COURSE

	NUMBER OF HOURS PER YEAR				
	1st Year	2nd Year	3rd Year	4th Year	Aggregate
<b>DEPARTMENT OF ENGINEERING</b>					
Carpentry .....	72	20	.....	.....	92
Sheet Metal.....	72	.....	.....	.....	72
Vise .....	.....	24	.....	.....	24
Forge .....	72	.....	.....	.....	72
Pattern .....	52	72	.....	.....	124
Machine .....	.....	48	72	.....	120
Mechanical Laboratory.....	.....	.....	72	.....	72
Mechanical Drawing.....	144	144	144	.....	432
Descriptive Geometry.....	.....	.....	36	.....	36
Surveying .....	.....	.....	36	.....	36
Machine Design.....	.....	.....	72	.....	72
Steam and Gas Engines.....	.....	144	108	.....	252
Mechanics .....	.....	.....	90	.....	90
Mechanics of Materials.....	.....	.....	90	.....	90
<b>DEPARTMENT OF MATHEMATICS</b>					
Algebra .....	144	108	.....	.....	252
Geometry .....	108	90	.....	.....	198
Geometry Analytic.....	.....	.....	144	.....	144
Trigonometry .....	.....	36	54	.....	90
Review .....	.....	.....	36	.....	36
Calculus, Differential.....	.....	.....	90	.....	90
Calculus, Integral.....	.....	.....	90	.....	90
Explanation and Demonstration.....	36	.....	.....	.....	36
<b>DEPARTMENT OF SCIENCE</b>					
Physics .....	.....	108	36	.....	144
Physics, Laboratory.....	.....	36	18	.....	54
Electricity .....	.....	.....	72	108	180
Electricity, Laboratory.....	.....	.....	36	36	72
Chemistry, General .....	.....	.....	36	54	90
Chemistry, Laboratory .....	.....	.....	18	18	36
Chemistry, Analytic .....	.....	.....	72	.....	72
<b>DEPARTMENT OF ENGLISH AND FRENCH</b>					
Composition and Rhetoric.....	72	72	.....	.....	144
French .....	144	126	108	.....	378
Literature .....	108	72	90	.....	270
Technical Composition.....	.....	.....	.....	36	36
<b>DEPARTMENT OF HISTORY AND CIVICS</b>					
History .....	180	.....	.....	.....	180
History and Civics .....	.....	144	.....	.....	144
<b>TOTAL.....</b>	<b>1,080</b>	<b>1,080</b>	<b>1,080</b>	<b>1,080</b>	<b>4,320</b>

## REQUIREMENTS FOR ADMISSION

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Pupils bearing properly attested certificates of having passed the prescribed Elementary School Course of the Public School System of Baltimore are entitled to enrollment.

Other applicants residing in the city will be admitted after passing an examination covering the requirements of the eighth grade. Eighth grade pupils who fail of promotion are not eligible for admission under this requirement. Specimen entrance examination papers covering the requirements of the eighth grade will be found on pages 48, 49 and 50.

After having passed successfully the entrance examination, a non-resident applicant must register as such at the office of the Secretary of the Board of School Commissioners, where he will be furnished with a bill for the first quarterly installment of the annual fee of \$85, and a presentation at the Institute of a coupon from the bill, signed by the City Comptroller, will be accepted as evidence of payment, and entitle the applicant to enrolment.

### MERIT ROLLS

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Merit rolls, showing the proficiency of students in each branch of study, are made out annually for the different classes.

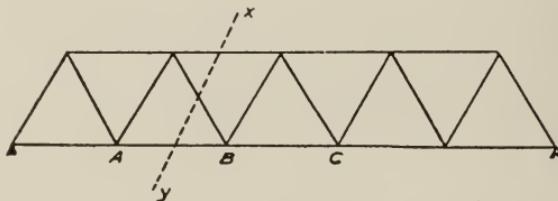
Each subject is assigned a coefficient indicative of its relative weight, and the final mark of a student in a subject (on a scale of 100) is multiplied by its coefficient. The sum of the products thus obtained is the final mark of the student in all the subjects for the year. This mark is a certain percentage of the sum of the coefficients, and such percentage is the student's average for the year.

**SOME RECENT EXAMINATION PAPERS****MECHANICS**

FOURTH YEAR CLASS—JANUARY 22, 1913

1. A stone is projected vertically upward with a velocity of 240 feet per second. How many feet will it pass over during the fourth second of its upward flight? At what altitude will it be at the end of the sixth second, and also at the end of the seventh?
2. Two ships leave a port at the same time, the first steams northwest at 12 miles per hour, and the second  $30^{\circ}$  south of west at 15 miles per hour. What is the speed of the second relative to the first? After what time will they be 100 miles apart, and in what direction will the second lie from the first?
3. A bullet weighing 1 oz. enters a block of wood with a velocity of 2,000 feet per second, and penetrates it to a depth of 6 inches. What is the average resistance of the wood to the bullet?
4. A locomotive draws a train weighing 200 tons along a level track at 30 miles per hour, the resistance amounting to 30 lbs. per ton. What horse-power is it exerting? Find also the horse-power necessary to draw the train at the same speed: (a) up an incline of 1 in 100, (b) down an incline of 1 in 100.
5. A cannon weighing 50 tons projects a shot weighing 2,000 lbs. with a velocity of 1,500 ft. per second. With what initial velocity will the cannon recoil? What average force will be required to bring it to rest in  $2\frac{1}{2}$  feet?
6. How long will it take a car weighing 10 tons to accelerate from 10 miles per hour to 15 miles per hour against a resistance of 25 lbs. per ton, if the motors exert a uniform tractive force on the wheels and the horse-power is 25 at the beginning of this period?
7. A wheel has five equally spaced spokes, all in tension. If the tensions of three consecutive spokes are 1,000 lbs., 1,500 lbs. and 2,000 lbs., respectively, find the tensions in the other two.
8. With a coefficient of friction of 0.15, what must be the inclination of a plane to the horizontal if the work done by the minimum force in dragging 50 lbs. a vertical distance of 5 feet up the plane is 400 foot lbs.?

9. Four forces of 6, 9, 4 and 5 lbs. act along the respective directions AB, BC, DC and AD of a square ABCD. Two other forces act one in CA and the other through D. Find their amounts if the six forces keep the body in equilibrium.
10. The jointed structure given below is built up of bars all of equal length, and carries loads of 10, 12, and 18 tons at A, B and C, respectively. Find by the method of sections the stress in each of the members cut by the section xy.



### MECHANICS OF MATERIALS

FOURTH YEAR CLASS—MAY 21, 1913

- Find the moment of inertia and radius of gyration of a trapezoid about an axis coinciding with the larger base.
  - A beam 28 feet long weighing 1,000 lbs. per foot overhangs the left support 5 ft. and the right support 3 ft. It bears concentrated loads of 1,000 lbs. and 4,000 lbs. at points 10 ft. and 21 ft. respectively from the left support. Construct the bending moment diagram. Linear scale, 1"=8'; bending moment scale, 1"=1,000 lbs. ft.
  - Construct the shear diagram for the beam of Problem 2. Load scale, 1"=3,000 lbs.
  - It is desired to place an I beam across an opening of 18 feet in a building. The beam is to sustain a concentrated load of 400 lbs. at a point 7 ft. from the left end and a uniformly distributed load including the weight of the beam of 200 lbs. per foot. Select a Cambria I beam for this case.
  - A continuous beam resting on three supports equally spaced and on the same level is uniformly loaded.
- Find: (a) The support reactions.  
 (b) An expression for the deflection at any section.

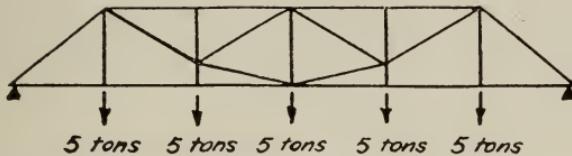
6. A hollow cylindrical cast iron column with square ends is 18 ft. long and has an outside diameter of 15 inches. Determine the inside diameter in order that it may safely bear a load of 300,000 lbs.

7. Find the width and thickness of the belt necessary to transmit 15 H. P. to a pulley 18" in diameter so that the greatest tension may not exceed 50 lbs. per inch of width when the pulley makes 400 r. p. m. The weight of the belt per square foot is 1.44 lbs. The coefficient of friction is 0.28, and the arc of contact is  $165^\circ$ . The weight of 1 cu. in. of leather may be taken as 0.036 lb.

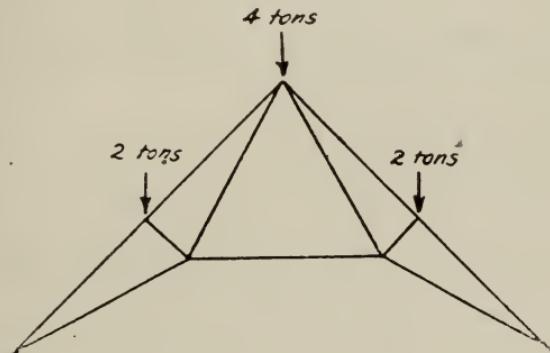
### GRAPHIC STATICS

8. A beam 28 ft. long weighing 100 lbs. per foot overhangs the left support 5 ft. and the right support 3 ft. It bears concentrated loads of 1,000 lbs. and 4,000 lbs. at points 10 ft. and 21 ft., respectively, from the left support. Construct the funicular polygon. What is the maximum bending moment? Locate the points of inflection if there are any. Linear scale, 1"=8'; load scale, 1"=2,000 lbs.; polar distance, 0.75".

9. Determine the stress in each member of the Greiner Truss. Load scale, 1"=5 tons.



10. The roof truss shown below has a span of 50 ft., the left end of the truss is free and the right end fixed. Normal wind pressure, 33 lbs. per sq. ft. of roof surface; distance between trusses, 14 ft. Consider the wind blowing on the left side of roof. Find the stress in each member of the truss. Linear scale, 1"=10 ft.; load scale, 1"=4 tons.



## STEAM ENGINEERING

THIRD YEAR CLASS—June 6, 1913

1. A vessel of 75 cu. ft. capacity contains air at a pressure of 150 lbs. per sq. in. Find the weight of the air in the vessel.

2. The following results were obtained from an efficiency test of an engine and boiler:

B. H. P. of engine.....	100
I. H. P. of engine.....	120
Steam used per hour.....	2,200 lbs.
Gauge pressure of steam....	99.3 lbs.
Temperature of steam.....	337.4° F.
Superheat of steam.....	50° F.
Coal used per hour.....	240 lbs.

Total heat lost in chimney gases per lb. of coal, 3,000 B. T. U.

The coal used contained 90% C., 2% H., 7% O., and 0.8% S. 20 lbs. of air were used in burning one lb. of coal. The temperature of the air supply was 57° F., and of the chimney gases, 620° F. The specific heat of N. is 0.244; of O., 0.218; of CO<sub>2</sub>, 0.217; of H<sub>2</sub>O., 4.42; and SO<sub>2</sub>, 0.17.

Find temperature of furnace.

3. From the data of problem 2 find:
- Mechanical efficiency of engine.
  - Thermal efficiency of engine.
  - Thermal efficiency of engine and boiler.
  - Boiler horse-power,
4. From the data of problem 2 find:
- Efficiency of combustion.
  - Efficiency of heating surface.
  - Efficiency of boiler.
  - Efficiency of System.

5. A triple expansion engine, having cylinders of 12", 17" and 22" diameter, and 10" stroke, has 0.5 cut-off in the high pressure cylinder and 6.5% clearance in each cylinder. Find the ratio of expansion. If the initial pressure is 200 lbs. per sq. in., find the terminal pressure.

6. During a boiler test in the Mechanical Laboratory of the Baltimore Polytechnic Institute the following was obtained with a barrel calorimeter:

160 lbs. of water at 65° F. in barrel before test.

10 lbs. of steam at 358° F. were blown into water in barrel.

120° F. temperature of mixture.

Find the dryness of the steam.

## STEAM ENGINEERING

FOURTH YEAR CLASS—June 11, 1913

1. A boiler evaporates 9 pounds of water per pound of coal into steam of 185 pounds pressure per guage from a feed water temperature of 152 degrees, the steam containing 3% of moisture. The coal contains 12% of ash and 4% of moisture. Find the actual evaporation and equivalent evaporation from and at 212 degrees per pound of dry combustible.

2. Required the cylinder dimensions of a compound engine to develop 2,200 I. H. P. while working under the following conditions: piston speed, 750 feet per min.; initial absolute pressure, 112 pounds per square inch; absolute back pressure, 2 pounds; cut-off in high-pressure cylinder, 0.4 of stroke; clearance in high-pressure cylinder, 12 per cent.; clearance in low-pressure cylinder, 10 per cent. Assume a cylinder ratio of 3.25 and a mean pressure factor of 0.8.

3. Stroke, 8 inches; steam lap,  $\frac{5}{8}$  inch, maximum port opening to steam  $9/16$  inch; exhaust lap,  $\frac{1}{8}$  inch; release 90 per cent. of stroke; connecting rod length, 15 inches. Find by means of the Zeuner diagram: travel of valve; angular advance; lead and cut-off in per cent. of stroke.

4. Stroke, 15 inches; clearance,  $6\frac{2}{3}$  per cent. of stroke; cut-off, 0.2 of stroke; pressure at cut-off, 76 pounds absolute. Plot the curves for hyperbolic and saturated steam expansion, finding points on the curve when  $r$  equal 2, 3 and 4. Lineal scale,  $3''=1'$ ; pressure scale,  $1''=40$  lbs.

5. Stroke of engine, 24 inches; clearance, 6 per cent. of stroke; cut-off,  $\frac{3}{8}$  of stroke; ratio of compression, 3; initial absolute pressure, 85 pounds; absolute back pressure, 18 pounds. Using the properties of the indicator diagram for preliminary engine design, find the mean effective pressure.

6. Using the data of problem number 5, determine the indicated steam consumption per indicated horse-power per hour.

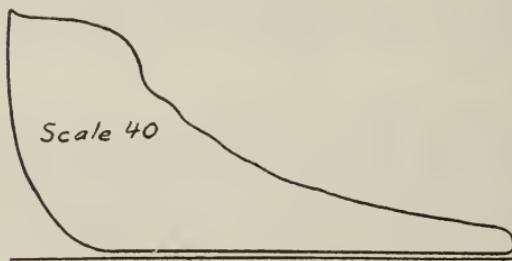
## STEAM AND GAS ENGINEERING

FOURTH YEAR CLASS—May 16, 1913

1. A Scotch boiler is to be designed to withstand a steam pressure of 250 lbs. per square inch and to have a diameter of 15'. The flat top of the combustion chamber is to have an area of 32"x48" and is to be braced with girder stays  $\frac{7}{8}$ " in thickness. The stay bolts are to be pitched at 6", the tensile strength of the steel used is to be 65,000 lbs. per square inch, and its factor of safety, 4.

Find (a) the depth of the girder stays; (b) diameter of the stay bolts; (c) thickness of the boiler shell.

2.



The above indicator card was taken from an engine having a clearance space of 5% of the stroke volume. Taking a point on the expansion curve at 65 lbs. absolute pressure and one on the compression curve at 22 lbs. absolute pressure, compute the indicated steam consumption per I. H. P. per hour.

3. Sketch the cylinder, piston and arrangement of the pumps of the Koerting, two-cycle, double acting, gas engine. Supplement your sketch with an explanation of their functions during one cycle.
4. Sketch a reversing gear for a marine gas engine. Describe its operation.
5. Draw indicator cards which illustrate the following: Throttling the normal charge; retarding the ignition; too early ignition; faulty exhaust.
6. State the cause of and remedy for the following faults: Knocking, crank-chamber explosions, smoky exhaust, loss of compression, premature ignition.
7. Sketch a Schebler carbureter. Describe its operation.

## MECHANICAL LABORATORY PRACTICE

FOURTH YEAR CLASS—May 29, 1913

1. Describe the process of making wrought iron. What is the effect of sulphur and of phosphorus on wrought iron? State the uses of wrought iron in engineering.
2. Describe Nickel Steel. Describe Tungsten Steel. What materials and what proportions of each are used in making semi-steel?
3. Define stress and strain. Describe the method of conducting a tension test on a specimen of wrought iron.
4. Derive a formula for use with the throttling calorimeter. Boiler pressure per gauge, 152.5 lbs.; barometer pressure, 20.62 inches of mercury; pressure in the calorimeter, 3 lbs. per gauge; temperature of steam in calorimeter by thermometer, 300 degrees F. Find the dryness fraction.
5. Sketch the Mahler Bomb Calorimeter and describe its action.
6. In a test made with a Junker Gas Calorimeter, the following data were obtained:

Inlet temperature, 66.5° F.; outlet temperature, 104.03° F.; temperature of gas, 85° F.; barometer, 29.8 inches of mercury; pressure of gas in pressure regulator, 0.0132 inches of mercury; and its vapor tension at 85° temperature is 1.209 inches of mercury. During the test 4.68 lbs. of water were heated by the use of 0.3 cu. ft. of gas, and 0.011 lbs. of water of combustion was trapped at a temperature of 50° F. Find: (a) Upper heating value, (b) lower heating value, (c) normal heating value.

## DIFFERENTIAL CALCULUS

FOURTH YEAR CLASS—June, 1909

1. Define increment and derivative. Illustrate by finding the derivative of the function  $y = \sqrt{a^2 - x^2}$ .

$$2. \text{ Find } \frac{dy}{dx} \text{ when } x = a \log \frac{y + \sqrt{y+a}}{\sqrt{a}}$$

3. What is the area of an equilateral triangle at the moment its side is increasing at the rate of 10 feet per minute and its area at the rate of 10 square feet per second?

$\frac{dy}{dx}$ 

4. Find  $\frac{dy}{dx}$  from  $y = (x^2+1) \sqrt{x^3-x}$ .

 $\frac{dy}{d\theta} \quad \frac{\sin \frac{\theta}{2} (\theta-a)}{\sin \frac{\theta}{2} (\theta+a)}$ 

5. Find  $\frac{dy}{d\theta}$  from  $y = \log \frac{\sin \frac{\theta}{2} (\theta-a)}{\sin \frac{\theta}{2} (\theta+a)}$

 $\frac{d^3y}{dx^3}$ 

6. Find  $\frac{d^3y}{dx^3}$  from  $y = (\sin x - \cos x) x e^x + 3e^x \cos x$ .

 $\frac{\log (x^2-4x+5)}{\log \cos (x-2)}$ 

7. Determine the limiting value of  $\frac{\log (x^2-4x+5)}{\log \cos (x-2)}$  when  $x = 2$ .

8. Find the tangent of  $44^\circ$ , using Taylor's Theorem.

9. A weight of 1,000 pounds hanging two feet from the fulcrum end of a lever is to be raised by an upward force at the other end. Supposing the lever to weigh 10 pounds per foot, find its length that the force may be a minimum.

10. Find the equations of the two tangents to the circle  $x^2+y^2-3y=14$ , parallel to the line  $7y=4x+6$ .

11. Change the independent variable from  $x$  to  $z$  in the following:

$$\frac{d^2y}{dx^2} + \frac{1}{x} \frac{dy}{dx} + y = 0, \text{ when } x^2=4z.$$

Omit any one except 4 or 9.

### INTEGRAL CALCULUS

FOURTH YEAR CLASS—June, 1913.

1. Show that the area of the triangle intercepted between a tangent to the curve  $2xy=a^2$  and the axes is constant and equal to  $2a$ .

2. Show that the curves  $y^2=ax$  and  $2x^2+y^2=b^2$  meet at right angles.

$y \quad z \quad x$

3. Given  $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$ . Prove that  $x$  multiplied by the partial derivative of  $u$  with regard to  $x$ , plus  $y$  multiplied by the partial derivative of  $u$  with regard to  $y$ , plus  $z$  multiplied by the partial derivative of  $u$  with regard to  $z$  is equal to zero.

derivative of  $u$  with regard to  $x$ , plus  $y$  multiplied by the partial derivative of  $u$  with regard to  $y$ , plus  $z$  multiplied by the partial derivative of  $u$  with regard to  $z$  is equal to zero.

4. Find the asymptotes of the curve  $(x-2a) y^2 = x^3 - a^3$ .

$$\frac{x^2}{a^2} + \frac{y^2}{b^2}$$

5. Find the volume generated by revolving  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  about the axis OY.

6.  $\int \frac{x^4 dx}{x^2 - 3x + 2} = ?$

7.  $\int \frac{\log x dx}{\sqrt{3x-2}} = ?$

8.  $\int \sin^2 x \cos^2 x dx = ?$

9.  $\int x^3 \log x dx = ?$

10. Find the area of one arch of the curve  $y = \sin \frac{1}{2}x$ .

### ANALYTIC GEOMETRY

THIRD YEAR CLASS—June, 1909

- Find the equation of the ellipse, having given the foci and the constant sum  $2a$ .
- The equation of an ellipse is  $25x^2 + 81y^2 = 450x$  when referred to rectangular axes. Find the major and minor axes and the co-ordinates of the centre.
- Tangents are drawn from (3,2) to the ellipse  $x^2 + y^2 = 4$ . Find the equation of the chord of contact, and of the line that joins (3,2) to the mid-point of the chord.
- Find the equations of the tangent and the normal to the hyperbola at the point  $(x_2, y_2)$  on the curve.
- Write the equation of the hyperbola conjugate to  $9x^2 - 16y^2 = 144$ , and find its axes, distance between its foci, and its latus rectum.
- Find the length of the semi-diameter conjugate to the diameter  $y = 3x$  in the hyperbola  $9x^2 - 4y^2 = 36$ .
- Define the Conchoid of Nicomedes. Develop its equation and discuss it.
- Plot the curve whose equation is  $r = a(1 - \cos \theta)$ .

**SURVEYING**

THIRD YEAR CLASS—June 12, 1908.

1. Show, by a drawing, a vernier reading 7.563.

2. From the following field notes, plot the field and calculate its area:

1. N.  $73^{\circ} 30'$  W. 5.00 chains.
2. S.  $16^{\circ} 30'$  W. 5.00 chains.
3. N.  $28^{\circ} 30'$  W. 7.07 chains.
4. N.  $20^{\circ} 00'$  E. 11.18 chains.
5. S.  $43^{\circ} 30'$  E. 5.00 chains.
6. S.  $13^{\circ} 30'$  E. 10.00 chains.

3. In the triangle ABC, AB=12 chains, AC=10 chains, and BC=8 chains; part off a trapezoid of 1 acre 96 perches by the line DE parallel to AB.

4. Write the proper numbers in the third and fifth columns in this scheme, make a profile of the section, and determine the gradient per station:

Station	+S	H.I.	-S	H.S.	Remarks
	6.944				
0			7.4		Bench on post 22 feet north of O.
1			3.9		
2			5.6		
3			4.6		
t. p.	3,855		5.513		
4			4.9		
5			3.5		
6			1.2		

**ELECTRICITY**

FOURTH YEAR CLASS—January, 1920

1. Name two advantages and one disadvantage of using nitrogen in the bulb of a tungsten or mazda lamp. Describe the magnetite lamp. What kind of current is necessary for its operation?
2. Why is a ground return preferred for railway work to a copper return circuit? When the return is through the ground, why is it necessary to bond the rails? What methods of bonding are in use?
3. Define reactance and impedance. Explain fully the meaning of root-mean-square value. Why is this value used for rating voltage and amperage for all practical calculations?
4. Describe how an electromotive force is produced in the secondary coil of a transformer by a current flowing in the primary coil. What determines the relative values of the volts in the primary and secondary coils? What is the relation of the currents in these coils?
5. Discuss the relative merits of the revolving field and revolving armature for alternating current generators. When a three-phase winding has been placed upon an armature, there are six ends. What is done with those ends so as to have only three leads to the bus bars?
6. Define the terms synchronous speed and slip, as used when referring to induction motors. Explain how the current in the rotor of an induction motor is increased and decreased by variations of the load.
7. A trolley line 6 miles long is supplied by a feeder whose sectional area is 1,000,000 circular mils, tapped at regular intervals. If there are 7 cars on the line, equally spaced at one mile apart, what will be the drop at each car, assuming a current of 75 amperes per car and considering the rail and the small part of the trolley wire in the circuit as having a negligible resistance?
8. What is the power factor of a load when the voltmeter indicates 13,200, the ammeter 60, and the wattmeter 1,234 kw., the line being a balanced three-phase circuit? How many kilowatts would be carried by a two-wire, single-phase circuit if the voltmeter, ammeter and power-factor values were the same as those given for the three-phase?
9. A transformer test gives the following data: Core loss, 120 watts; copper loss, 120 watts when the secondary current is 20 amperes. What will be the efficiency of the transformer when delivering 12 amperes at 110 volts? What will be the value of the secondary current when the transformer is operating at maximum efficiency?

10. A three-phase generator, star-connected, has 960 conductors per phase, total 2880, the flux per pole being  $6 \times 10^6$  lines of force. There are 32 poles and the revolving field makes 94 r. p. m. The armature winding is three-section, the constant being 0.96. Calculate the line voltage.

#### FOURTH YEAR CLASS—January, 1920

1. Why is it necessary to laminate the armature cores of all kinds of generators and motors? What is the object of the commutator? Make a diagram of the connections of a shunt generator, showing lamps, field magnets, field rheostat, ammeter and voltmeter.

2. Give the fundamental equation of a motor, explaining the meanings of the terms used. Why is it necessary to use a starting rheostat for shunt or compound motors? Why is a low-voltage release required?

3. Explain the meanings of the terms flat-compound and over-compound. What losses occur in motors and generators during operation?

4. What two effects are produced by armature reaction? State clearly the effect of each upon the generator. What three methods may be used for determining the temperature of the parts of a generator or motor?

5. What occurs in a lead cell when not properly cared for? What should be done when the electrolyte gets low in the jar from evaporation? What is meant by end cells?

6. Describe the Edison three-wire system, using diagram. What is meant by an unbalanced system? How much current is carried by the neutral wire?

7. A shunt motor has an armature resistance of 0.2 ohm and makes 1,200 revolutions per minute when the armature current is 3 amperes at 220 volts. What will be the speed when the motor is so loaded as to permit 75 amperes through the armature?

8. A four-pole generator has 316 conductors upon the armature and each field pole gives a flux of  $3 \times 10^6$  lines of force through the armature. What electromotive force will be generated when the armature revolves at 1,050 revolutions per minute?

9. A shunt motor is connected to a 125 volt line and shows a current of 2.2 amperes through the field and 3.1 amperes through the armature at no load. The resistance of the armature being 0.3 ohm,

what will be the efficiency of the motor when the armature current is 30 amperes?

10. Calculate the size wire required for a balanced three-wire system supplying current for 500 lamps, 60 watts each, the distance from the generator to the lamps being 200 feet. The lamps receive 110 volts and the generator supplies 230 volts. Also calculate the weight of copper required, considering 0.00000303 lb. as the weight of a mil-foot of copper.

## CHEMISTRY

### FOURTH YEAR CLASS—January, 1920

1. A Powder contains  $\text{NaNO}_3$ ,  $\text{PbCl}_2$ ,  $\text{SrCO}_3$ ,  $\text{Ag}_3\text{PO}_4$ ,  $\text{PbSO}_4$ ,  $\text{HgS}$ , and  $\text{BaSO}_4$ . How could these salts roughly be separated? Represent all interactions by equations.

2. In tabular form, PRINT the molecular formula, color, and solvent for each of the salts named below:

- |                          |                          |
|--------------------------|--------------------------|
| 1. Lead Chromate.        | 6. Cupric Acetate.       |
| 2. Antimony Trisulphide. | 7. Nickel Sulphate.      |
| 3. Ferric Hydroxide.     | 8. Cobalt Nitrate.       |
| 4. Ferrous Oxalate.      | 9. Manganese Sulphide.   |
| 5. Cupric Ferrocyanide.  | 10. Bismuth Oxychloride. |

3. State what qualitative tests could be used to detect the following named substances, printing the equations:

- |                         |   |
|-------------------------|---|
| 1. Hg in Calomel.       | 6. $\text{NH}_3$ in Sal Ammoniac.                       |
| 2. As in White Arsenic. | 7. $\text{PO}_4$ in Soluble Phosphates.                 |
| 3. Zn in German Silver. | 8. $\text{CO}_3$ in Marble                              |
| 4. Ca in Quick Lime.    | 9. $\text{S}_2\text{O}_3$ in Hypo.                      |
| 5. Mg in Epsom Salts.   | 10. $\text{C}_4\text{H}_4\text{O}_6$ in Rochelle Salts. |

4. How may the metals be separated in a solution of antimony and tin? In a solution of chromium and aluminum? Show in tabular form, how the valance of iron in a salt may be established? How may nickel sulphide be distinguished from cobalt sulphide? How may potassium be recognized in the presence of sodium?

Why is  $\text{H}_2\text{SO}_4$  added in a test for a borate,  $\text{CS}_2$  in a test for an iodide,  $\text{H}_2\text{O}_2$  in test for a bromide,  $\text{Na}_2\text{SO}_3$  in a test for a chlorate, and  $\text{HCl}$  in a test for a cyanide.

5. How could pure silver and pure copper be obtained from a United States silver dollar? Name a solvent for gold and for platinum. Write a sample laboratory report for the analysis of cadmium nitrate.

## CHEMISTRY

FOURTH YEAR CLASS—January, 1920

1. By the use of symbols, name two metallo-acid elements. Give formulas for water glass, acetylene gas, baking soda, bleaching powder, basic copper carbonate, three amphoteric hydroxides, three common reducing and four common oxidizing agents. By structural formulas show the valence of iron in potassium ferrocyanide, in potassium ferricyanide, and in magnetite ( $\text{Fe}_3\text{O}_4$ ). What are colloids?

2. Show the formation of three reduction products of nitric acid and one of sulphuric acid by writing four equations, demonstrating at the same time the valence of a univalent, a bivalent, and a trivalent metal. Give an example of a basic and of an acidic anhydride in two equations.

Construct ionic equations to represent the preparation of the following compounds:  $\text{Sb}_2\text{O}_3$ ,  $\text{Na}_2\text{ZnO}_2$ ,  $\text{KAu}(\text{CN})_2$ ,  $\text{H}_2\text{PtCl}_6$ ,  $\text{H}_2\text{SnO}_3$ ,  $2\text{PbCO}_3$ ,  $\text{Pb}(\text{OH})_2$ .

3. Give the suggested information concerning the metals named in the following tabulated form:

1. Fe, Cu, Zn—2 Ores each, in formulas.
2. Ca, Hg—Atomic weight; valence.
3. Ag, Mg, Al—Hydrogen equivalents.
4. Pb—4 Physical properties.
5. Al—3 Chemical properties.
6. Fe—Metallurgy (equations).
7. Au, Pt—3 Commercial uses of each.
8. Ag, Cu, Br,  $\text{CO}_2$ —Tests in equations.
9. Cu, Sb, Bi, Pb—Composition of 2 alloys of each.
10. Sn—3 Solvents with equations.

4. Express in as few words as possible and in the necessary equations the chemical interactions involved in Nos. 1, 4 and 10 and any other two of the following processes:

1. Manufacturing crown glass and a fertilizer.
2. Bleaching with chlorine and with sulphur dioxide.
3. Liberating iodine from KI and etching glass.
4. Photography; Printing ferro-types (blue prints).
5. Electrotyping; Nickel, silver or gold electroplating.
6. Tipping matches or backing "silver" mirrors.
7. Metallurgy of copper, aluminum and lead.
8. Mordanting calico and purifying water.
9. Rendering cotton goods non-inflammable.
10. Preparing calomel, colloidal gold or platinum black.

5. How much  $\text{SiO}_2$  is needed to react with 123 grams of C in making carborundum? How much CSi will be formed during the interaction? How many liters of CO, if measured at  $20^\circ\text{C}$  and 724 mm. pressure, will be liberated?

Calculate the hydrogen equivalent of a bivalent metal from the following data: Weight of metal, 0.112 gram; measured volume of hydrogen 25 cc.; temperature  $20^\circ\text{ C}.$ ; barometric pressure, 740 mm. Aqueous tension for  $20^\circ\text{ C}.$ , 17.4 mm. After solving, name the metal.

## ENGLISH

### FIRST YEAR CLASS—January, 1918

1. Why is the "Sketch Book" so named? What is the general character of the contents of the book?
2. What relation is there between Irving's life and the settings of his tales and sketches?
3. Contrast Rip and Van Tassel as farmers.
4. (a) Tell briefly the story of any one of Hawthorne's tales; (b) What are the most striking differences between Hawthorne's and Irving's tales
5. (a) What moral lesson did Lowell aim to teach in "Sir Launfal?" (b) Write a paragraph on "The Contrasts in Sir Launfal."
6. Who are gathered about the Whittier fireside? Describe the character that is clearest in your mind.
7. What pleasures did the Whittier household have?
8. Give a short summary of any one of Poe's Tales.

## ENGLISH

### THIRD YEAR CLASS—January, 1918

1. On what occasions do storms occur in "Julius Cæsar" and "Macbeth?" What use does Shakespeare make of these storms?
2. What is the theme, the exciting force, the climax, and the catastrophe of (a) "Julius Cæsar?" (b) "Macbeth?"
3. Discuss Duncan's fitness to be ruler of the Scotland of his day. Compare him as a ruler with Julius Cæsar.
4. Describe Lady Macbeth's preparations for the murder of Duncan.

5. Describe the difference in the response of the populace to Brutus and Antony when they spoke at Cæsar's funeral. Account for the difference.
6. What fatal mistakes did Brutus make in his counsel to the conspirators? Would Cassius's advice, if followed, have been more likely to lead to success?
7. Contrast Lady Macbeth and Portia in their characters and in their relations to their husbands.
8. When does Shakespeare use prose and when verse? Account for the distinction.

### ENGLISH

FOURTH YEAR CLASS—January, 1918

1. Discuss the essential differences between technical and non-technical writing.
2. Write to Scott, Foresman & Company, 8-12 East 34th street, New York, an order for at least three text-books that you have used during the past year.
3. Make an outline and write a theme on one of the following subjects (limit 200-350 words):
  - (a) A steam boiler test.
  - (b) Cement testing.
  - (c) Testing engineering materials for tension, compression, and transverse loading.
  - (d) Description of a lathe and its operation.
  - (e) Your course in machine-shop practice during the half-year just closed.

### ENGLISH HISTORY

FIRST YEAR CLASS—January 19, 1917

(Answer eight questions.)

1. Name three changes occurring in the Tudor period which show that mediaeval life and conditions were breaking up. Describe each of the three changes.
2. What change took place in the power of the king during the reign of Henry VII? By what means was this change brought about?
3. How did the feudal system tend to prevent national unity? When was this effect best seen in England? Why was it not more greatly felt at other times in the middle ages?

4. Describe a mediaeval manor and tell how it was cultivated.
5. What classes of people were not satisfied with the religious settlement of Elizabeth? Explain in detail the reasons for their dissatisfaction.
6. Why were the higher clergy so often employed in the service of the government? Name three well-known ministers of this class.
7. Write about two of the following named topics: The Rivalry of the early Anglo-Saxon kingdoms; the king and the witenagemot in the 10th century; Cnut and his reign.
8. Describe two: The Salisbury Oath; the civil war of Stephen's reign; the establishment of a Norman aristocracy in England.
9. Explain two: The effects of the Crusades in England; the Provisions of Oxford; the Admission of Commoners to Parliament.
10. Discuss fully two of the following named topics: The Statute of Apprentices; the causes of the War with Spain; the Poor Laws of Elizabeth.

**AMERICAN HISTORY AND CIVICS**

SECOND YEAR CLASS—June 2, 1916

(Omit one Question in each Group.)

(GROUP A)

1. Give the political history of Kansas from the passage of the Kansas-Nebraska Act down to 1861.
2. Compare the North and the South before the Civil War from an economic standpoint. Explain in detail how each side got its funds to carry on the war.
3. Explain the Congressional Plan of Reconstruction. Wherein did it fail?
4. Write an account of some particular service that each of the following named persons has rendered to the people of the U. S.: Charles F. Adams, Wm. H. Seward, John Sherman, Thomas Edison, George Westinghouse.
5. What is the Interstate Commerce Commission? Explain its powers as stated in the Acts of 1887, 1903, 1906.
6. What was the attitude of the following named presidents upon the question of civil service reform: Lincoln, Arthur, Grant, Roosevelt? Contrast McKinley and Cleveland on the question of the annexation of Hawaii.

## (GROUP B)

7. Give an account of the work of either the Democratic or Republican State Convention in Maryland this year.
8. How is the tax rate for Baltimore determined? How many members are there in the City Council of Baltimore? Write a short account of the principal duties of the Mayor of this city.
9. Distinguish between General Assembly and House of Delegates. Name one important piece of legislation accomplished by the law-making body of this state at its last session. Discuss it. Describe the system of State Courts in the counties of Maryland.
10. Distinguish between a corporation and a trust. What is the Sherman Anti-trust Act? What are the duties of the Federal Trade Commission?

**SPECIMEN ENTRANCE EXAMINATION PAPERS**

Set for Pupils Other Than Those Promoted From  
the Elementary Schools.

**SPELLING AND PENMANSHIP**

Writing from dictation a paragraph or two of some standard text—Irving's Rip Van Winkle or Bancroft's United States History.

**GRAMMAR**

- I. Use each part of speech in a different sentence, indicating the part of speech used in each sentence by underscoring and naming it.
- II. Define and give an example of a simple sentence, of a complex sentence, and of a compound sentence.
- III. Parse the italicized words in the following sentence: "By not heeding the *counsels* of our elders, *how* often do we *lose what* we should gain!"
- IV. Analyze the following sentence: "If we send the sailors a message in time, they will help us when the savages attack."
- V. Write sentences illustrating the correct use of any perfect tense of each of the following verbs: sit, set, seat, lie, lay, write, go.

**COMPOSITION**

The subject set is a description of some well-known place or object or an account of some historical event.

**AMERICAN HISTORY**

1. What parts of the American continent were explored or settled in early Colonial times by each of the following named nations?
  - (a) Spanish
  - (b) French
  - (c) English.
  - (d) Dutch.
  - (e) Swedes.

2. Mention two explorers who were prominent in the service of the Spanish; two who were prominent in the service of the French; two who were prominent in the service of the English.
3. Write a short account of the early history of the colony of Maryland.
4. Write a short account of the settlement of Virginia
5. (a) What were indentured servants?  
(b) For what was William Penn noted?  
(c) For what was Roger Williams noted?
6. (a) Tell the story of Braddock's defeat.  
(b) Tell the story of General Wolfe's capture of Quebec.  
(c) What terms of peace were made between the French and the English by the Treaty of Paris in 1763?
7. (a) Mention three causes of the American Revolution.  
(b) Mention two prominent British generals, and two prominent American generals who served in the Revolution.  
(c) Give a brief account of the Battle of Long Island, explaining the object of each commander and the result of the battle.
8. (a) Tell the story of the Louisiana Purchase.  
(b) Tell the story of the Lewis and Clark Expedition.
9. What were the causes of the Mexican War? Mention two leading American generals, and state briefly what each accomplished.
10. Tell briefly for what each of the following was noted:
  - (a) Thomas Jefferson.
  - (b) Henry Clay.
  - (c) Andrew Jackson.
  - (d) Daniel Webster.
  - (e) Abraham Lincoln.

**ARITHMETIC**

1. Divide 5.375 by 0.0125, obtaining the exact results.

$$2. \text{ Simplify } \frac{1+0.5}{1-0.5} \times \frac{0.05 \div 0.005}{0.005 \div 0.05} = \frac{0.04\frac{1}{2}}{0.22\frac{2}{9}}$$

3. A merchant's sales on Monday amounted to \$385.84. His sales on Monday were  $16\frac{2}{3}\%$  of 54% less than the amount of goods sold on Tuesday. What was the amount of Tuesday's sales?

4. A firm sold an engine for \$7,050, thereby losing 6%; for what should it have been sold in order to gain 12%?

**ALGEBRA**

1. Factor the expressions:  $a^2 + 6ax + 5x^2$ ,  $n^{10} - 16n^5 - 80$ , and  $1 - 9x - 36x^2$ .

$$2. \text{ Simplify } \left[ (a^2 - x^2) \div \left( \frac{1}{x} - \frac{1}{a} \right) \right] - \left[ (a^2 - x^2) \div \left( \frac{1}{x} + \frac{1}{a} \right) \right]$$

$$3. \text{ Given } \frac{2x+1}{5} - \frac{3y+2}{7} = 2y - x, \frac{3x-1}{4} + \frac{7y+2}{6} = 2x - y \text{ find}$$

the value of  $x$  and  $y$ .

## CATALOGUE OF STUDENTS

Students whose names are marked with an asterisk (\*) received 85% or more of the possible multiple for the year.

### MID-YEAR CLASS OF 1920—31 MEMBERS

#### (“Ax” Class)

Benson, William Howard	Loane, Jabez W.
Blum, Leonard H.	Morris, Harry
Bookman, Isadore H.	Neavitt, Henry Clay
Bork, F. Milton	Nechamkin, Harry
Brown, Donald S.	Pavlik, J. Edward
Carter, George A.	Petrik, George J.
Chamberlain, James L.	Raver, J. Wilmer
Darley, George L.	Rose, Julius O.
DiDomenico, Joseph F.	Russell, Edward L.
Dorsey, J. Richard	Seitz, Henry,
Dreyer, Frederick W.	Tarr, Wadsworth W.
Eskridge, Ira E.	Warfield, Calvin N.
Gross, George J.	White, Clinton N.
Harrison, Henry L.	Wisner, Jackson W.
Kratz, Wm. S.	Wright, Edwin F.
Lindauer, Fred. J.	

### CLASS OF 1920—151 MEMBERS

#### (“A” Class)

Acker, Swope	Bosley, Allmon
Albaugh, Arthur	Boyd, Wm. H. A.
Alrich, Benjamin D.	Braun, Frederick D.
Armstrong, Elwood J., Jr.	Brickman, Robert
Auer, Robert P.	Brown, Charles W.
Awalt, Thos. Young	Brown, Ryland A.
Baernstein, Harry	Brumble, Frederick E.
Ballard, Jas. S.	Burgemeister, Frederick C.
Barron, Robert	Calvert, J. Elmer
Berigtold, Charles N.	Catanese, Santi John
Berkemeier, George, Jr.	Caulk, Edwin C., Jr.
Black, C. Howard	Civis, Jos. A.
Bortner, Wm. A.	Dannettel, Raymond C.

- Dantoni, John  
Davidson, Jacob I.  
Deatel, George A.  
Dietrich, A. Austin  
Dreyer, John E.  
Dryden, G. Gray  
Duval, John Paul  
Edwards, S. Everett  
Engleman, Frank H.  
Ensor, John S., Jr.  
Fairbanks, James G., Jr.  
Fleischer, Benjamin  
Frank, Charles A., Jr.  
Freed, Irvin  
Freeland, Louis A.  
Freese, Charles T.  
Gahs, Lockerd S.  
Garwood, Milton T.  
Gerstmyer, Henry  
Ghent, Pierre M.  
Ginsberg, Louis Martin  
Goldsmith, Herman A.  
Goran, Isadore  
Gorsuch, John L.  
Green, Philip W.  
Gross, George J.  
Gunther, John H.  
Hall, John W.  
Harris, J. A. Latane  
Harwetel, William L.  
Haynes, Harry R.  
Henson, Carvel  
Hoffman, Lawrence P.  
Houghton, Holden R.  
Israel, Robert  
Jenkins, Edward E.  
Joesting, Henry R.  
Johnston, Emmett V.  
Kann, Manuel L.  
Keen, George A.  
Kellner, Sidney G.  
Kern, Leroy Wm.  
Kidd, James K.  
Knighton, Marshall H.  
Koch, Charles Justus  
Krausse, Henry W.  
Kutzleb, Richard, Jr.  
Lang, John Jacob  
Lebovitz, Louis S.  
Lebovitz, Samuel L.  
Lee, Robert Allan  
Lieder, Adolph M.  
Lucy, Frederick M.  
Lynch, George W.  
MacMillen, G. Alton  
Maccubbin, Howard A.  
McGruder, James McE.  
Mathews, F. LeRoy  
Maxwell, Thomas  
Mecaslin, Harry B.  
Mercer, Harry W.  
Mertz, Harry Leroy  
Messersmith, Olin Wm.  
Meyer, Wm. C.  
Middleton, Wm. Vernon  
Miles, Henry V.  
Milinausky, Anthony G.  
Miller, Joseph B.  
Mitchell, H. Kemp  
Muhly, Melvin J.  
Muzdakis, John R.  
Myerberg, Julius  
Meyers, John Wm.  
Neale, E. Tilghman  
Norwood, W. Daggett  
Poehlmann, George H., Jr.  
Preston, Wilbur J.  
Prince, Charles E., Jr.  
Revere, T. Harold  
Richardston, E. Irvin  
Roche, B. Hamilton  
Sack, Carl J.  
Sann, J. Carl  
Schaefer, Edward J.  
Schaefer, Henry W.  
Schiefer, Charles J.  
Schmidt, Charles J., Jr.  
Schmidt, Walter E.  
Schnieder, C. Arthur  
Schroeffel, John B.  
Schuerholz, V. Leroy  
Schuster, Louis F.

Scott, Arthur Russell	Torsch, John Bauman
Shaeffer, Theodore F.	Tribull, John G.
Shaffer, G. Sylvester	Tyson, Earle S.
Silver, David H., Jr.	Vester, Wilbert H.
Sisco, Spencer E., Jr.	Vogel, H. Holmes
Slama, J. Frank	Volker, Milton C.
Slowik, Boleslaus T. J.	Vonhausen, William W.
Small, Carroll F.	Wade, J. Edward
Small, Frederick R. H.	Walter, Carl E.
Smith, Frederick C., Jr.	Warner, Douglas R.
Smith, William Elmer	Wasserman, Charles
Sopher, Harry	Weihmiller, Horace E.
Speer, John Carl	Weiner, Bernard
Stabler, A. Douglas	White, Howard Mayhew
Steen, H. McCullough	Williams, George W., Jr.
Sunderland, James E.	Williams, N. Bancroft
Swayne, Norman E.	Winkelman, Louis A.
Thomas, John B.	Young, Thomas Lorman, Jr.

## MID-YEAR CLASS OF 1921—101 MEMBERS

(“Ax” Class)

Barnard, Marshall	DeHoff, John F.
Berger, George Herman	DeLauder, Thomas A.
Bergin, Charles K.	Dorsey, Charles A.
Berlin, Nathan	Eggerstedt, Roland W.
Black, Henry R.	Evans, John E.
Bloomsburg, Marvin S.	Feast, Charles F., Jr.
Born, Harry Carl	Feaster, Wilbur C.
Boyce, Wm. Edward	Field, Bryan H.
Bradfield, William S.	Foland, David
Brian, George Tennyson	Fonshill, Wm. Ira
Burkhart, Lewis E.	Glidden, Edward H.
Callis, Eugene J. M.	Gold, I. Justinus
Campbell, Donald R.	Goldsborough, Donald H.
Carrick, George F.	Heese, John Paul
Carroll, Charles G.	Hewitt, Wm. George
Chambliss, Richard J.	Heyne, Charles P., Jr.
Cohen, Allen	Hoffman, Samuel Z.
Coleman, F. Gordon	Houck, Fred. Holmes
Coneby, Harvey Edgar	Howser, Sellman
Cook, William A.	Immler, Charles Wm.
Criswell, Alfred Wm.	Jensen, Peter A.

Kaufmann, Norman	Prechtel, Harry L., Jr.
Kent, Laurason R.	Rodeman, George A.
Kershaw, Arthur F.	Rutherford, John A.
Klein, Daniel E.	Schiaffino, Frank
Kloppel, Edward B.	Schmidt, L. Pelham
Kratz, Wilbur	Schneider, William
Langkam, John, Jr.	Schulte, Harry Roland
Lazzell, Charles B., Jr.	Shure, Walter H.
Levy, Wm. Randolph	Siegel, Gustav G., Jr.
Lovett, Benjamin B.	Smith, J. Raymond
Lucas, Frank Atkinson	Spencer, Webster Lindsly
Lucas, Paul Boughton	Stewart, Webster L.
Ludwig, William Charles	Stinchecum, Lawrence S.
McDonagh, Leo C.	Strow, Frederick R.
Mengers, C. Randolph	Sturmfels, Albert L.
Miller, E. Laurence	Taylor, J. Edward
Miller, Horace L.	Tebo, Julian Dremer
Moehle, Frederick Louis	Tebo, Kenneth P.
Morgan, Howard, Jr.	Thomas, James William
Muessen, Henry John	Trier, Carl L.
Newmann, Herbert E.	Trieschman, William O.
Norris, E. Paul	Uhl, Frederick Elmer
O'Connor, Richard Page	Ulrich, H. Albert, Jr.
O'Keefe, Michael F.	Wagner, Charles Maynard
Orban, Chas. S.	Welker, Frank Jos.
Osborn, Marion S.	Weirauch, Joseph Lester
Pearce, Wilbur C.	Will, Louis Hoffman
Pledge, John A.	Zerner, Rudolph F.
Plumer, Louis	Zollman, Lee J.
Poehlman, Edmund F.	

## CLASS OF 1921—191 MEMBERS

(“B” Class)

Abbott, Elbert E.	Bausman, Edward H.
Abbott, Laurence G.	Beach, Paul
Alder, Mordew Newton	Berthold, John W., Jr.
Arthur, Frank S.	Betz, Paul L.
Atkins, Craig S.	Bindok, Edward J.
Aubel, Paul K.	Bishop, Henry M.
Baake, Elmer H.	Blumberg, Emanuel
Bald, George H., Jr.	Boeckner, Carl
Barr, F. Morgan	Bomhardt, G. Clifton

- Brattan, Thomas H.  
Braun, Wallace L.  
Bronner, Charles H.  
Brown, James E.  
Buffington, Howard F.  
Burgess, Clarence C.  
Bushey, J. Hobart  
Calhoun, Paul Reid  
Chrest, Charles L.  
Cleaveland, Allan M.  
Cochran, John Andrews  
Cohen, Isadore M.  
Cohen, Jacob of N.  
Cohn, Nathaniel  
Connelly, Lorenz  
Cooper, Charles J.  
Dawson, Marion T.  
Deaver, Charles Clarke  
Dixon, John Tillotson  
Dodson, Henry Clay, Jr.  
Donovan, Gordon I.  
Dreyer, Frank Vernon  
Ebaugh, Irvin H.  
English, Hunter O.  
Eppler, John B.  
Falkenwald, Charles O.  
Foley, Roland D.  
Fox, Daniel M.  
Freudenthal, R. Bernard  
Frey, Frank G., Jr.  
Friedman, Harry  
Friedman, Nathan  
Frieman, Harry  
Gallagher, Edmund G.  
Gerstmyer, Henry B.  
Givner, David  
Goldberg, Abraham  
Goldberg, Abraham J.  
Green, Harvey T.  
Griffith, Robert C.  
Grill, Charles F.  
Haefner, F. William  
Hall, Claude H., Jr.  
Hamburger, Ferdinand, Jr.  
Harrison, William G.  
Hartung, William  
Hawthorne, Charles H.  
Hayden, Benjamin S. Jr.  
Henschen, Leroy  
Hines, Wm. Dorsey, Jr.  
Hoge, Bernard P.  
Hooper, Wallace J.  
Horner, Edwin O.  
Houston, Albert T.  
Ilgenfritz, C. Nelson  
Iverson, George Dudley  
Jensen, Holger, Jr.  
Johnson, William Earle  
Kaplan, Joseph  
Kern, Frederick S.  
Keuchen, Armin R.  
Knecht, Francis A.  
Knierim, Carl A.  
Knipp, Donald  
Kooke, Charles A.  
Kornblatt, Joseph  
Kraft, John Fred.  
Krug, Lloyd, L.  
L'Allemand, William  
Land, Abraham  
Larash, Clayton J., Jr.  
Lautenbach, W. Kenneth  
Laux, Louis A.  
Lease, H. Gwynn  
Lehmann, Leslie S.  
Lenderking, Carroll M.  
Levene, August  
Levin, Harry  
Lindauer, Edwin R.  
Long, G. Allison  
McComas, Henry A.  
McCrone, John R., Jr.  
McKinstry, William G.  
Mackert, W. Raymond  
Marburger, Thomas E.  
Marlow, C. Lester, Jr.  
Marrian, Dixon M.  
MarSheck, R. Wilbur  
Maser, Harold T.  
Meekins, Elmer F.  
Mellor, Harry P.  
Milinausky, William Edward

- Mitchell, Gordon  
Moore, Milton B.  
Morrison, Charles  
Muzdakis, Joseph L.  
Nace, Austin F.  
Neavitt, William Alvan  
Neuman, Emil G.  
Opie, John N., 3rd  
Opitz, Frank M.  
Oshrin, Samuel  
Pentz, John A.  
Peters, Frank E.  
Pierson, H. Kirvan  
Pratt, Sidney H.  
Primrose, Samuel F.  
Prissman, Harold H.  
Pritzker, Leon  
Quandt, Russell W.  
Rankin, Isadore  
Regester, Robert T.  
Rehberger, Milton  
Reich, Edwin H.  
Reiss, Milton  
Richards, Wm. Lester  
Riggin, John W.  
Robins, Reginald S.  
Robinson, Edwin O.  
Rodgers, William W.  
Rodman, Morris  
Rogers, D. Grafton  
Romoser, William K.  
Rubin, Bernard M.  
Sanders, James M.  
Schafer, C. Leonard  
Schanze, Edwin S.  
Schimmel, John, 3rd  
Schmidt, Ferdinand H.  
Schmiedicke, Ferdinand C.  
Schramek, Charles  
Shaffer, Carl H.  
Shaffer, Arthur F.  
Shelley, Armiger D.  
Shockett, Harry M.  
Shower, Edmund G.  
Shultz, Charles E.  
Siegrist, Clifford W.  
Sills, O'Donnell  
Silverman, Alexander M.  
Singleton, C. Clayton  
Smith, Harry E.  
Smith, Sidney L.  
Smith, William F.  
Sopher, Maurice  
Steinberg, Samuel  
Stevenson, David H., Jr.  
Stewart, Rae Winchester  
Strohm, George T.  
Svejda, Anthony C.  
Taylor, Louis  
Taylor, Louis T.  
Tocker, Ellis  
Townsend, Ralph H.  
Trout, William E., Jr.  
Turnbull, Douglas C., Jr.  
Tyler, Emerson W.  
Tyler, William T.  
Ulrich, Henry  
Waesche, Norman E.  
Wagner, Raphael  
Walters, Norman F.  
Watson, Edward H.  
Wehr, Fred. L.  
Wehrenberg, W. Fred. L., Jr.  
Weis, George Henry  
Werner, John H.  
Wharran, William T.  
Wieland, Edward F.  
Willoughby, Carl E.  
Wilner, Joseph A.  
Witzke, Carl H.  
Wolfe, Charles Burr  
Young, Kimmel Laurel

## MID-YEAR CLASS OF 1922—147 MEMBERS

(“Bx” Class)

Aarons, Harold Jerome	Gebhart, Lawrence J.
Allen, Leroy W.	Gerstmyer, William A.
Albrecht, Walter Edward	Goodwin, Charles B.
Ashley, Raymond L.	Goosman, Fred. C.
Ashley, W. Layton	Gordon, Graham S.
Bahlke, George W., Jr.	Gorrell, Wilson, Jr.
Baker, Orison W.	Graff, Richard
Barton, John Cole	Hall, John M., Jr.
Bassford, Morris B.	Hall, Spencer C.
Beaufelter, George T.	Harp, Robert E.
Beckner, Clinton Fred.	Haslup, Charles L.
Boone, J. Marshall	Hellen, Charles L.
Bourbon, Arthur F.	Henck, John T.
Boxer, Tobie	Herbert, John F., Jr.
Braun, Millard S.	Hicks, Fred. Gordon
Bumgarner, Albert S.	Holt, Charles T.
Bunnell, Kendall P.	Huth, Edward Philip
Burke, N. Charles, Jr.	Joyner, Lloyd M.
Byrne, Reynold H.	Kalbfleisch, Karl
Byrne, T. Leonard	Kaufman, Edward L., Jr.
Childs, Wm. Melville	Kaufman, Jesse D.
Ching, Richard A.	Keller, Jack Wm.
Claypoole, Edwin W.	Kelley, Wm. B.
Cohen, Leon	Kimmel, John J.
Cohen, Meyer S.	King, Edwin L.
Cottman, Llewellyn P.	Korff, William F. C.
Dahne, Leon	Kuebler, Charles M.
Davis, Howard L.	Lambdin, Earl Francis
DeCaindry, William A.	Lang, Frank W.
Decker, William C.	Leib, James Fulton
Dost, William A.	Leilich, Robert
Doty, Elmer C.	Logan, T. Joseph
Doxzen, William E., Jr.	Lutz, Dallas T.
Duncan, G. Hall	MacKenzie, John M.
Falkenwalde, Charles O.	MacLellan, Russell T.
Fifer, George W.	Magruder, Edward
Finnan, C. Marshall	Mallonee, Charles G.
Fraser, William C.	Milbourne, Charles G.
Frey, Donald P.	Miller, Arthur N.
Friant, Elias S.	Murray, James H.
Gardner, Clark	Newton, Howard J.
Glatt, Benjamin	Ningard, Milton O.

Otis, John P., Jr.	Stevens, Roland
Parks, William T.	Stolar, Samuel M.
Phillips, Leroy J.	Stuart, J. Nelson
Pitcher, Bernard M.	Stumpf, William E.
Powers, John A.	Thayer, Richard P.
Purdy, William Nelson, Jr.	Timanus, Wm. Raymond
Rein, Charles George F	Tormey, Harry H.
Reinhardt, C. Howard	Totzke, Fred. A.
Retaliata, Casper	Townsend, Edward
Reynolds, Herbert	Turner, Franklin S.
Ritte, Gordon A.	Tyler, Harry L.
Roseman, Oscar Harry	Van Doren, Wilbur
Rossing, Raymond J.	Vaughan, Eugene A.
Sanders, George W.	Vogt, George F.
Sauer, George E. M.	Voigt, Herman A.
Schafer, Albert C.	Volz, John A.
Scherch, Erich	Volz, John G.
Schilling, Wilfred	Wade, Leon H.
Schlicker, J. Nicholas	Weber, John Daniel
Schmuff, George F., Jr.	Weil, Isador
Schuman, Morris	Weller, John
Sheeley, Howard R.	Welsh, Robert I.
Shipley, Marvin E.	White, Edwin
Sills, Edward	Williams, Roger B. T.
Slade, Samuel Wm.	Wilson, Thomas T.
Smith, Charles E., Jr.	Winship, Alvin A., Jr.
Smith, Millard K.	Woodall, Edward McClay
Spyr, William S.	Wright, John D.
Stagmer, Owen R.	Wright, Walter R.
Stauffer, F. Herbert	Yater, Richard J.
Staylor, John C.	Zies, William F.
Stevens, Eldridge T.	

## CLASS OF 1922—407 MEMBERS

(“C” Class)

Aaronson, Harry H.	Armstrong, J. Ernest
Abrahamowitz, Max	Arnold, Joseph F.
Ainslie, Douglas, Jr.	Ashman, Joseph
Akelitys, J. E. Andrew	Badger, Walter L.
Altman, Frank	Baish, Eugene L.
Amoss, Allen B.	Baker, C. Harold
Anstine, J. Scott, Jr.	Baker, J. Wilmer
Appel, Herman E.	Barger, B. Frank

- Barnes, Wilmer N.  
Barnes, W. Henry  
Barron, Sylvan  
Bartholomew, John  
Becker, Isador  
Becker, Joseph W.  
Beecher, William G.  
Behrend, Alvin  
Benson, Paul R.  
Besore, M. Otis  
Biddison, John S., Jr.  
Blankner, Earl M.  
Blanks, David W.  
Blohm, William H., Jr.  
Blome, William J.  
Blumenthal, Leo F.  
Bobbitt, Theodore T.  
Bock, Leonard J.  
Bodine, Frank E.  
Bohanan, Walter  
Bortner, Stanley  
Bosley, Charles L.  
Boss, A. Kenneth  
Bowers, Edward C.  
Bradfield, Curtis G.  
Breeback, Rudolph H.  
Brown, Norman E.  
Brown, Norman W.  
Burgess, B. Robert  
Burroughs, Paul F.  
Bushman, Ralph E.  
Campanella, Salvatore, Jr.  
Carr, Gordon W.  
Carroll, William  
Cavano, Herbert E.  
Chesney, Morris B.  
Clark, Stephen  
Clubb, Earl C.  
Cohen, Edward I.  
Cohen, Hyman  
Cohen, Jacob  
Cohen, Morris  
Cohen, Samuel  
Cohen, Solomon A.  
Colvin, Paul  
Copsey, Kenneth Allen  
Cordes, Elmer G.  
Creaghan, George W.  
Crook, David E.  
Crosbie, John H.  
Cusack, Frederick S.  
Damitz, Edward J.  
Dashiells, George K.  
Davidson, Edwin R.  
Davis, T. Bertram  
Daws, H. Richard  
Dietrich, Horace W.  
Ditman, Paul L.  
Diven, John  
Donahue, James I.  
Donelson, N. Raymond  
Doody, John R.  
Downs, Robert N.  
Dreisch, Joseph E.  
Durling, C. Raymond  
Dutkowski, Albert  
Ebberts, George L.  
Efron, Jacob  
Eggling, John H., Jr.  
Eisinger, Frank  
Ellenberger, H. Leonard  
Ellert, Charles A.  
Embury, Melvin W.  
Engel, Harry J.  
Englar, Donald H.  
Erthal, Karl E.  
Evans, A. Eugene  
Fagan, Morris  
Faringer, Emory B.  
Fedder, Eli  
Feige, William C.  
Feinberg, Barney  
Filbert, N. Ellwood  
Finger, Otto John  
Fisher, Robert B.  
Fluharty, Charles M.  
Ford, Watson I.  
Fousek, Charles L.  
Fox, Harry G.  
Frentz, William F.  
Freud, Alfred L.  
Friedman, Louis

- Friedman, Reuben A.  
Geffert, Henry F. E.  
Gibson, Thomas  
Glover, Lawrence B.  
Goetzke, L. Elbert  
Goldberg, Victor  
Goldbloom, Herbert J.  
Gollery, John William  
Graham, W. Daniel  
Grandberg, Abraham  
Granger, Harry  
Grant, Malcolm H.  
Grant, William E. Bartlett  
Green, Norman E.  
Grieb, Conrad K.  
Griffith, Goldsborough  
Grossfield, Michael J.  
Gunzelman, Charles A.  
Gutsmuth, Harry, Jr.  
Hackett, G. Richard  
Hackett, Richard R.  
Hahn, L. Gordon  
Hain, Jacob L.  
Hamm, William J.  
Hammond, Nelson  
Hammond, Thomas O.  
Hancock, Harry W.  
Handleman, Louis  
Hanson, Charles R.  
Harding, R. Kenneth  
Hardy, R. Francis  
Hargett, Eugene  
Harrington, Paul S.  
Harris, Charles H.  
Harris, Quintin  
Harrison, C. Oliver  
Hartzell, J. Graham  
Haslup, Leroy  
Hayden, James L.  
Hearn, Benjamin F.  
Heil, G. Lawrence  
Heinert, Albert E.  
Henkel, John F.  
Herrmann, William A.  
Heubel, Frank J.  
Hicks, C. Underwood  
Hill, S. Sterling  
Hipp, James E.  
Hirschowitz, Reuben R.  
Hobbs, Douglas, T.  
Hoffenberg, Harry E.  
Hoffmeister, Henry J.  
Hoffmeister, Raymond B.  
Hofmeister, Arthur G.  
Hokanson, William A. G.  
Holland, R. Carroll  
Holls, Oswald O.  
Holtz, John Cromwell  
Honeman, Leroy B.  
Hood, J. Wilson  
Hook, Addison E.  
Howard, Charles E.  
Hucke, J. Raymond  
Huffington, Marion R.  
Hughes, James R.  
Hunter, William Falkner  
Hurst, E. Hamilton  
Imbach, Edwin C.  
Jacobson, Joseph S.  
James, David D.  
Jamrick, William Esdon  
Jelenko, Carl G., Jr.  
Johannessen, Walter  
Johnson, Henry B., Jr.  
Johnson, Howard F.  
Johnson, Thomas J.  
Jones, Roland E.  
Jones, Thomas T.  
Kadlick, Frank  
Kaplan, Karl  
Karfgin, John W.  
Karwacki, Leo Daniel  
Keen, Frank P.  
Kellert, M. Morris  
Kellner, George  
Kempter, Paul  
Kenney, Norman D.  
Kermisch, Albert  
Kern, John R.  
Kines, Charles R.  
Kirk, C. Wallace  
Kirk, F. Shallus

- Kirtley, St. Clair D.  
Kleckner, Albert S.  
Klenske, Raymond W.  
Knight, E. Joseph  
Knox, Walter F.  
Koch, Jerome M.  
Kozubski, Louis Michael  
Krastman, Michael J.  
Kravetz, Louis  
Krebs, W. Norris  
Kupfersmidt, Maurice E.  
Kummell, Fred. A., Jr.  
Lachman, Louis  
Lamm, William J.  
Landow, Bernard E.  
Lane, S. Paul  
Lau, Richard H.  
Lautenberger, Joseph W.  
Leaf, Arthur B.  
Lebowitz, Samuel  
Lehman, A. Charles  
Lehr, William E.  
Lemchen, Milton B.  
Lenger, F. Herman  
Levi, Morris  
Levin, Moses  
Levy, Aaron  
Liebmann, Charles B.  
Linville, C. Stuart  
Lion, John, Jr.  
Long, James A., Jr.  
Loskot, F. James  
Ludicke, Gerhard  
McCallister, James G., Jr.  
McCauley, Everett S.  
McComas, J. Ross, Jr.  
McKay, Alfred J.  
McLean, Albert R.  
MacLean, Hall R.  
McLernon, Edward M.  
MacWilliams, Henry Dawson  
Maglidt, Henry W.  
Marks, Samuel R., Jr.  
Marr, Theodore E.  
Mason, Howard R.  
Matejka, Alfred J.  
Mathias, Alfred L.  
Matusevitz, J. Vincent  
Medinger, Gordon  
Melocik, Adam P.  
Michael, Monroe  
Michel, Edward O.  
Miles, William J.  
Miller, Ambrose P.  
Miller, John G.  
Miller, Meyer M.  
Miller, W. Laurence  
Mitchell, James M.  
Mitchell, Parker, Jr.  
Mooney, Howard  
Moore, Evans W.  
Morgan, John W.  
Morrison, Samuel  
Moses, Bernard  
Mules, Mehrling F.  
Mund, Samuel  
Neer, Charles P.  
Newman, Oakford  
Newman, Solomon  
Niner, Arthur M.  
Ningard, Paul S.  
Norfolk, Parker F.  
Norris, Robert  
O'Connell, Ivan  
Palmer, Richard H.  
Parsons, John W.  
Paxton, Jean  
Penn, E. Austin  
Pentz, Z. Allen  
Petrella, Frederick J.  
Pfetzing, Charles H., Jr.  
Phelps, B. Clinton  
Phipps, Lester E.  
Pollard, Douglas G.  
Pollekoff, David  
Porter, William W.  
Poteet, J. Wilmer, Jr.  
Powell, Leonard E.  
Powers, Vincent E.  
Primrose, Frank, Jr.  
Pritchett, Clinton J.  
Propf. William H.

Purple, William <b>Charles</b>	Snyder, C. Wilmer
Reimer, C. Edward	Snyder, Russel H.
Reinhardt, H. <b>Elmer</b>	Sobelman, Edmund
Resnick, Myer	Sodergran, Carl J.
Robertson, Paul	Sonneborn, M. Tracey
Robinson, Charles O.	Sparks, Thomas C.
Rodman, John B.	Spicknall, Thomas E.
Roesner, Henry J.	Spilman, Allen W.
Rosen, William	Springham, G. Russell
Rostovsky, Abraham	Stahl, F. William
Rudel, Harry W.	Stallings, Francis B.
Ruppel, Philip	Stapf, Leroy
Ruzicka, J. Vernon	Stein, P. Charles
Salafia, Samuel V.	Stein, William J.
Sanderson, Harold T.	Steinbach, Robert C.
Sandlass, Henry L.	Stern, Louis
Sauer, John A.	Stewart, Dennis C.
Schamberger, Karl H.	Stiegler, Oscar
Schapiro, Sylvan B.	Stitzenberger, Wilbert
Scheiman, Jacob	Stone, George E.
Schissler, C. Earl	Strasburger, Charles M.
Schmidt, Edward H.	Styrlander, Erik G. G.
Schoenharr, H. Leslie	Susemihl, C. Harry, Jr.
Schwaner, Nelson M.	Skain, Lawrence C.
Schwedel, Bernard	Swope, John L.
Scott, Lester	Taylor, Edward C., Jr.
Seibold, William F.	Taylor, John W.
Seidman, Morris	Taylor, Malcolm R.
Seim, Henry D., Jr.	Thompson, Joseph
Serpick, Jacob	Thompson, Norman B.
Shapiro, Henry	Thompson, P. Donald
Shauck, C. Edward	Titter, Russell
Shaw, Louis A.	Tolzman, Edward Fred. J.
Sheil, Edward John	Tottle, John W.
Shipley, J. LeVere	Tretick, Myer
Shipley, Otho	Tuerke, L. Leroy
Shugar, Morris	Turow, Herman
Shulman, Emanuel	Tyrrell, Walter M.
Sill, VanRenssilair	Urlakis, Otto L.
Simpson, O. Chauncey	Utz, Joseph B., Jr.
Small, Joseph	Varney, W. Henry
Smith, E. Landon	Volke, Elmer P.
Smith, John L.	Waldorf, Sigmund K.
Smith, Marion C.	Wallman, Harry
Smith, Reginald Clyde	Warfield, Guy T., Jr.
Smith, Walter H., Jr.	Warmbold, James William

Watson, Kenneth C.	Wilner, Maurice A.
Weaver, Alva P.	Winchester, B. Vernon
Webb, William B.	Winter, F. Theodore
Weiss, William J.	Witofsky, Michael J.
Weller, Harry J.	Wood, William R. C.
Wells, Morgan C.	Yarmosky, Morris
Wentworth, C. Howard	Yolken, Henry D.
Wessels, Forrest A.	Young, Ralph W.
Wiegard, Paul J.	Zerner, Harry B.
Wilhelm, Edwin H.	Zito, Samuel J.
Williams, Edward S.	Zoeller, William F.
Williams, Fletcher J.	

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## MID-YEAR CLASS OF 1923—235 MEMBERS

(“Cx” Class)

Albert, Henry	Civis, Clement Leo
Albrecht, William F.	Cohen, Gustum
Anderson, John W.	Cohen, Raymond W.
Arnold, I. Edwin	Command, Carlton W. B.
Balk, George E.	Corcoran, Edward M.
Ball, D. Ronald	Costello, Owen
Barker, Hugh J.	Crist, Philip J.
Barr, Joseph Pierce	Cronhardt, Raymond N.
Beachom, Robert J.	Dawkins, Walter S.
Betts, Harvey L.	DiDomenico, Anthony
Bird, Benjamin L.	Dillon, John J.
Bishop, Alexander H.	Dixon, J. Kenneth
Bobbitt, Finley M.	Dohme, Ralph J.
Boehne, John F. L., Jr.	Dougherty, Thomas C.
Bopst, Louis D.	Drnec, Joseph J.
Bosley, Albert C.	Duncan, G. Gerald
Bowen, Henry B.	Edlavitch, Martin
Braun, Paul G.	Edwards, Malcolm M.
Briscoe, Chas. W. L.	Ehlers, Thomas B.
Buckingham, Richard M.	Eitel, E. Norwood
Bromelsick, Roland R.	Eitemiller, Richard S
Burgess, J. Franklin	Elsnic, Charles J.
Burnett, Cornelius	Ely, James H., Jr.
Bushman, James Wm. J.	Erberts, Joseph J.
Carr, James E.	Eskridge, J. Milton
Cassidy, F. Henry	Ewalt, George L., Jr.
Charshee, Arthur T.	Farber, Solomon H.
Chilcoat, Stewart I.	Farnen, Charles W.

- Feefer, Paul J.  
Feimster, E. Andrew, Jr.  
Fink, Norman  
Foote, Arthur C.  
Forni, Paul W.  
Forsythe, Carl  
Friedman, Charles  
Fritchey, Eugene F.  
Garcelon, Daniel H.  
Gartside, Edward  
Genese, Francis D.  
Gesell, Charles E.  
Gillingham, Miles H.  
Goldberg, Louis  
Graham, Frank C.  
Granoff, David  
Gray, Howard T.  
Green, Oscar D., Jr.  
Grice, Harry L.  
Greenberg, Joseph  
Gross, Edward W.  
Gross, R. Edward  
Hamman, H. Edgar  
Hamson, Oscar E.  
Hantman, Harry H.  
Hardesty, Lee P.  
Harris, Abraham  
Harris, Howard  
Harris, Leslie A.  
Harryman, Charles N.  
Harvey, Robert B.  
Hass, Charles Wm.  
Heine, Thomas W.  
Herman, John R., Jr.  
Hill, Fred. J.  
Hillner, Charles E.  
Hoeder, Winfield S.  
Hoffert, J. Frederick  
Holland, Robert C.  
Hoover, W. Herbert  
Horst, Louis, Jr.  
Houston, Edgar W.  
Hurley, Earle P.  
Johnson, T. Merrill  
Jones, Robert W.  
Karasik, Morris H.  
Keen, Austin J.  
Kelbaugh, Roland S.  
Kelty, W. Ralph  
Kemp, G. Earle  
Keppler, J. Raymond  
Kernan, Edward  
Kirwan, Fred.  
Kleeman, Elmore J.  
Klein, G. Elmer  
Kostka, Richard L.  
Kramer, Edward Wm  
Kratz, John H.  
Krug, Elwood H.  
Kuethe, J. Louis, Jr.  
Landon, Roy Hart  
Lang, Wilmer J.  
Lautenberger, L. Henry  
Lazauskas, William  
Lazzell, William John  
League, Arthur E.  
League, Herbert E.  
LeComte, C. Edwin  
Lenz, Gifford  
Levine, Emanuel  
Lewis, Henry  
Lidie, Howard C.  
Lipscombe, Charles W., Jr.  
Long, G. Harry  
Lotz, F. Arthur  
McDonnell, Eugene B.  
McLaughlin, William F.  
McNab, Douglas  
Marciniak, John A.  
Martin, William J.  
Martin, William M., Jr.  
Mason, W. Randolph  
Meeks, William Harlan  
Messersmith, J. Ernest  
Miceika, Anthony J.  
Miller, George S.  
Miller, Melvin F.  
Miller, Victor  
Moshevich, Max  
Mowbray, Orville H.  
Mund, Fred. W.  
Musselman, Jackson

- Muth, C. Leroy  
Nadisch, William  
Nixon, Louis C.  
Norris, J. Reginald  
Norris, Richard M.  
Owings, B. William  
Peltz, Joseph J.  
Peters, Brice G.  
Poehlman, Ralph L.  
Porst, Edward G.  
Prodoehl, Emile H.  
Ransom, Joel R.  
Rawlings, Philip T.  
Rheb, Edward A.  
Riess, Herman  
Rinker, Parker B.  
Rodgers, Evans I.  
Rodgers, William W.  
Roe, Edmund L.  
Roeder, George H.  
Rogers, William  
Root, Kenneth W.  
Rosenbauer, Harry B.  
Ruckle, E. Edgar  
Rupert, Walter P.  
Ruppel, Philip  
Ruzicka, Richard F.  
Sanks, Thomas H., Jr.  
Santiago, Benjamin P.  
Satterfield, James W.  
Savage, Bernard M.  
Schaefer, Ridgely J.  
Schiebel, F. Uriel  
Schroeder, Frederick  
Schulte, J. Ernest  
Schwartz, G. Dowell  
Schwartz, Maurice  
Sevier, Crawford V.  
Shafer, David P.  
Shafer, T. Benton  
Shaffer, Harry P.  
Shearer, James F.  
Shew, John  
Snyder, Raymond A.  
Sommer, John  
Standiford, Grason R.  
Staub, John T., Jr.  
Steinberg, Joseph  
Steinwald, Osmar P.  
Stephens, Charles H.  
Stevens, Lester B.  
Stiner, Norman G.  
Stokes, George C. A.  
Stone, Walter McI.  
Strecker, Winfield Charles  
Stroble, Calvin M.  
Suter, B. Edward  
Suwall, Bernard F.  
Svejda, Joseph Leo  
Swanson, Arthur  
Swein, Edward M.  
Telle, Isadore  
Thompson, James Leroy  
Thorne, Eugene E.  
Tillery, Joseph J.  
Tood, George B.  
Toelle, Milton F. H.  
Waesche, H. William, Jr.  
Ward, William L.  
Webster, Sewall M.  
Weeks, Malcolm  
Welmon, William C.  
Wheeler, Millard F.  
White, Whiteford W.  
White, William C.  
Whiteford, Haughton  
Wilkinson, William H.  
Wilson, George A., Jr.  
Wirth, William Henry  
Wright, Nathaniel V.  
Yingling, Henry C.  
Yost, Frank  
Zajic, V. Joseph  
Zell, Randolph  
Zeman, Vincent J.  
Zies, Carl W.  
Zouck, Howard L.

## CLASS OF 1923—747 MEMBERS

(“D” Class)

Ahroon, Carl Richard	Berman, Samuel
Albers, Eberhardt	Berney, Samuel S.
Albrecht, Nelson W.	Berryman, Thornton C.
Aldridge, J. Bartlett	Bertuck, Maxwell D.
Almony, Norman S.	Beveridge, Bruce M.
Anderson, George	Beverungen, Walter Richard
Andriekas, Clemens V.	Biener, William A.
Angele, Gustave J.	Bihy, Carroll V.
Appleby, Joseph L.	Billmire, Garrett O.
Apsley, William E. J.	Bishop, John
Armor, George Maxwell	Bishow, Jacob
Armstrong, John William	Blair, George W.
Artigiani, John B.	Block, John F.
Asher, Fancis M.	Bloxom, Henry C.
Atkinson, Edward A.	Blume, Guilford
Ayers, John E.	Bochau, Carl T.
Ayers, Lewis S.	Bodein, Irvin B.
Bachtell, John H.	Bodein, Vernon
Bagwell, James N., Jr.	Boerschel, August J.
Bailey, Rollin S.	Boessel, Martin E., Jr.
Baker, Fank Ernest	Bohnet, Charles F.
Ball, Alan J.	Bond, Lloyd F.
Barnhill, Roy	Bonday, Frank J.
Barrett, Leslie W.	Bonn, Ewing T.
Bartjis, William	Bostic, William C.
Bates, John W.	Bowden, Henry T.
Baum, Sidney D.	Bowersock, Warren A.
Beall, John Wilson C.	Boyer, Norval G.
Bean, John H.	Bramble, John H.
Bean, William J.	Brengle, Earl H.
Beatty, J. Franklin	Brickman, Louis
Beaumont, William D.	Briddell, Charles O.
Bechtol, Bradford	Brocius, Francis
Becker, Charles E.	Brockie, William E.
Belt, Parran	Brockman, William H.
Beneze, George L.	Brodsky, Morris
Benhoff, Arthur H.	Broenig, Walter
Benjamin, Melvin	Bronstein, Harry
Bennett, George	Brooks, Charles H.
Berger, John H.	Bross, Edward E.
Berger, Robert E. L., Jr.	Brown, Harry E.
Bergler, Anthony J.	Brown, Hooper W.

- Brown, Luther P.  
Brown, Paul  
Brunner, Carl A. A.  
Bryant, Allan T.  
Burnham, Clarence J.  
Burns, Harry  
Burry, Samuel D.  
Buselmeier, Alexander O.  
Butschky, Eugene W.  
Butts, Leonard E.  
Byns, Stanley A.  
Byrd, Clarence O.  
Cadwallader, Clinton E., Jr.  
Cain, Charles D.  
Caine, John F., Jr.  
Campbell, Francis F.  
Campbell, Preston S.  
Carelton, Richard L.  
Carliner, Samuel  
Carmen, J. Melvin  
Carpman, Meyer  
Carroll, Arthur L.  
Carroll, Jerome F.  
Carter, Frank  
Case, George E., Jr.  
Cassidy, Edward C.  
Castine, Norman  
Caulk, Leon C.  
Chambers, James H.  
Chambers, Lee C.  
Chance, Elmer M.  
Chandler, L. William  
Chertkof, Samuel  
.Childs, Lee P.  
Childs, Nathan W.  
Christian, Thomas L.  
Christie, James R.  
Clark, Charles F.  
Clark, H. William  
Clugston, Charles E.  
Cochran, Robert G.  
Codd, Ronland  
Cohen, Herman  
Cohen, Jacob of M.  
Cohen, Max  
Coleman, Richard  
Comi, Joseph J.  
Compton, Frederick L.  
**Conrad, Edward G.**  
Constantine, Charles A.  
Cook, William Frederick, Jr.  
Coplin, Isador  
Correll, William M.  
Cosgrove, Thomas E.  
Coster, William W.  
Covell, V. Howard  
Cox, Robert R.  
Coxon, Henry John  
Craig, George R.  
Creighton, James A. C.  
Crew, Bruce  
Crist, Philip  
Cromwell, Charles G.  
Cromwell, Thomas M.  
Cross, Philip R.  
Crowther, Walter  
Cusack, John Nixon  
Cruse, Henry P.  
Curlett, John N.  
Curtis, Franklin O.  
Czarnecki, Stephen  
Daley, Frank D.  
Darley, Ralph E.  
Davies, John F., Jr.  
Davis, Bernard S.  
Davis, Harvey M.  
Davis, Lawrence H.  
Davis, Robert B.  
Dean, Edwin H.  
DeGreif, Louis  
Decker, James M., Jr.  
DeHoff, Samuel H.  
Dempsey, John V.  
Dewling, Littell E.  
Didwald, Joseph  
Dietz, Herman M.  
Dietz, Hyman  
Dietz, W. Emory  
Dillon, Charles R.  
Disney, James G.  
Ditman, Wilbur L.  
Diven, Thomas M., Jr.

- Dorrett, Walter W.  
Dotterweich, Henry F.  
Downing, William  
Doyle, John P., Jr.  
Dreschler, Raymond F.  
Durham, F. Russell  
Easter, Frank M., Jr.  
Easter, Henry J.  
Eckels, George T.  
Edel, Paul J.  
Edelmann, Adam T.  
Edwards, Franklin  
Eichner, Frederick S.  
Eifert, John H.  
Eitze, James E.  
Elder, Clarence M.  
Ellison, David L.  
Engnoth, Charles F.  
Ensor, William E.  
Euler, George S.  
Evans, Amoss  
Evans, Clement  
Fairbank, Francis  
Fee, Tolford H.  
Ferguson, William K.  
Fields, Edwin Watkins  
Files, Eitel M.  
Fink, William  
Finlay, William S.  
Fisher, William H.  
Fite, Franklin A.  
Flack, James W., 3rd  
Flaggs, Newell C.  
Flayhart, Howard S.  
Flayerty, Morton  
Flesher, C. Willrose  
Flichman, Charles W., Jr.  
Flynn, William  
Foss, Gilbert, A. F.  
Fowler, Henry C.  
Fox, Charles C.  
Fox, Henry  
Fox, Martin  
Fox, Robert L.  
Francis, Marion A., Jr.  
Franck, Clarence C.  
Frazer, John L.  
Freeman, Edward B.  
Frey, Howard A.  
Frey, Julian J.  
Friedman, Harry of S.  
Friedman, Herman  
Friedman, Nathaniel  
Fromm, August R.  
Fuchs, Frank N.  
Fuller, Harry I.  
Gaither, Herman E.  
Gallagher, Thomas E.  
Galloway, R. Wilbur  
Ganter, Carl A.  
Gardiner, Edwin M., Jr.  
Garrett, Robert F.  
Gary, Charles T.  
Gaskill, Albert J.  
Gauss, Gus E.  
Geraghty, M. Joseph  
Gettier, Norman W.  
Giacomo, Peter, Jr.  
Giese, Oscar W.  
Gillen, Paul B.  
Gillespie, Myrl E.  
Girding, Henry E.  
Gleisner, John P. B.  
Glock, Russell  
Goetz, Charles  
Goetz, William A.  
Gold, Isaac  
Goldberg, Herman  
Goldman, Rubin  
Goldstein, David  
Goodrich, Thomas W.  
Gordon, Albert S.  
Gordon, Jacob B.  
Gotthelf, David  
Gough, Melvin N.  
Gourley, James R.  
Goyert, Herman B.  
Graf, William, Jr.  
Graham, Frank H.  
Gray, Calvin C.  
Green, George H.  
Griffith, Louis

- Gross, George Charles L.  
Gruber, Adnah LeRoy  
Gunther, Carl F.  
Hackett, Patrick Francis  
Hackney, William W.  
Haffer, Odell S.  
Hagerman, Haslup G.  
Hall, William B.  
Halstead, Egbert S.  
Hammond, Allen B  
Hand, Dewey F.  
Hanewinkel, William A., Jr.  
Hanna, Edgar  
Harden, Richard E.  
Hare, Alton  
Harmatz, Leonard  
Harold, Joseph F.  
Harrison, James A.  
Hart, Roland W.  
Hart, William L.  
Hartley, Brent  
Hartman, Henry W.  
Harvey, Charles W.  
Harvey, William J.  
Harwetel, Marshall L.  
Hasenkamp, Edwin  
Hathaway, Walter E.  
Hatter, Charles W.  
Hazell, Charles Clement, Jr.  
Head, Harry M.  
Heathcote, Henry E.  
Heer, William J.  
Heinbuch, John L.  
Heinritz, Robert C.  
Heinstadt, John J.  
Heinz, Carl A.  
Helldorfer, Joseph  
Hennedy, Joseph L.  
Henschen, Robert  
Hentschel, Richard J.  
Hepburn, David R.  
Herbst, Louis William  
Herget, Henry G.  
Herman, Frank  
Herman, Judel  
Herold, Alexander E.  
Herold, Joseph F.  
Herold, Melvin I.  
Heuisler, Louis C.  
Heyman, Reuben  
Hill, Carroll Dunnington  
Himelfarb, Harry  
Hindes, Jaseph  
Hirshauer, Victor J.  
Hobbs, Jonathan W.  
Hofferbert, John R.  
Hoffman, Herbert  
Hoffman, Milton  
Holdefer, Wilfred F.  
Holder, Rufus W.  
Holmes, Arthur C., Jr.  
Holmes, Reginald S.  
Holtgreve, Herman William  
Holzapfel, Carl M.  
Hook, Milton F.  
Hopwood, Charles Edward  
Horton, William D.  
Horowitz, Morris  
Hoshall, Alton Y.  
Houk, George E.  
Hudgins, Alvin R.  
Hunt, Herbert  
Hunt, William E.  
Hupfl, Andrew J.  
Hurwitz, Max  
Iglehart, Nathan E. B., Jr.  
Illick, James J.  
Isaac, Tilghman W.  
Ives, Guam Dudley  
Jackins, Charles  
Jankowski, Adam W. J.  
Jansen, Alfred H.  
Jarboe, Marvin Y.  
Jenkins, Donald  
Johannesen, Robert M.  
Johenning, Ernest W.  
Johns, William C.  
Johnson, Carlton Chase  
Johnson, James  
Johnson, Wilbert F.  
Jones, Horace  
Jones, Jackson

- Joyce, William X.  
Kahn, Frank S.  
Kalus, August J.  
Kaufman, John W.  
Keech, Rea Hammond  
Keller, Frederick  
Keller, Stanley L.  
Kelly, John, Jr.  
Kelly, R. Leonard  
Kemp, Earl George  
Kempel, Tilyard W.  
Kennard, G. Washington M.  
Kenney, George E.  
Kirchner, Charles  
Kirshke, Otto  
Kleff, Arnold J., Jr.  
Klepper, Charles E.  
Knapp, George V.  
Kniesche, Robert F.  
Koch, Edward C.  
Koeber, Frank G.  
Koester, Henry  
Kolb, Raymond J. J.  
Kollmer, Adolph W.  
Kolseth, Harold R.  
Kominetsky, David  
Kraft, Alfred W.  
Krebs, H. William  
Kreiling, Emil E.  
Krumm, Robert E.  
Kuff, Herbert  
Kuhne, Walter H.  
Kummer, Ervin A.  
Lammers, Walter J.  
La Monoco, Lawrence  
Lang, Donald R.  
Lang, Edward G.  
Langeluttig, Harry V.  
Langville, Charles  
Lautenklos, Henry C.  
Lawrence, James T.  
Laws, Raymond  
Lazerovitz, Sol  
Leef, John W.  
Lenz, William A.  
Leonard, Charles, Jr.  
Lester, Wayne Alsworth  
Levin, Sam Herbert  
Levin, Theodore  
Levy, Albert  
Lewenberg, David  
Linn, Charles E.  
Linsenmeyer, Norbert J.  
Livingston, Harry  
Livingston, William T.  
Lobe, Napoleon B.  
Logan, Francis E.  
Lohr, Joseph H.  
Loizeaux, Stanley G.  
Long, Norris W.  
Lorraine, Pryor M.  
Lotz, Arthur F.  
Louis, George J.  
Loveless, Luther B.  
Lowenthal, Gilbert  
Luter, James G.  
Lynch, Charles Robert  
Lyons, Ralph A.  
Lyston, James  
McAvoy, Thomas Dowell  
McCarron, Frank X.  
McCrea, Eugene  
McCrone, Richard B.  
McCubbin, Robert G.  
McKay, Clyde  
McKenny, Clayton T.  
McLaughlin, George E.  
McLaughlin, Joseph L.  
McLeary, Allan Ross  
McNeil, Hugh D.  
McSweeney, John  
MacCubbin, Pentz John  
Mackenzie, Colin F.  
Mallonee, Leroy T.  
Manger, Allen H.  
Manger, Irving L.  
Mann, Frederick T.  
Marks, Sidney  
Marley, George E.  
Marlow, James D.  
Martin, Pendleton B.

- Mason, Leonard  
Mather, Vernon E.  
Mauldin, Walter S.  
Merican, Isidore  
Meyer, Carl, Jr.  
Meyer, John A.  
Meyer, William J.  
Middleman, Paul  
Miles, Clarence Pierce  
Miller, Charles B.  
Miller, Donald R.  
Miller, Edward  
Miller, Luke F.  
Miller, Vernon Eby  
Miller, Walter Vernon  
Miller, William Howard  
Miller, William S.  
Millison, Harry  
Mills, Joseph Harry  
Mintiens, George H.  
Mitchell, Charles B., Jr.  
Mitten, Stanley R.  
Mitchell, Theodore W.  
Moore, Elmer Charles, Jr.  
Morgan, Algred K.  
Morrison, Wilson R.  
Morrow, Robert B.  
Morton, Marion M.  
Mosner, John H.  
Mueller, S. Frederick  
Muhl, E. Robert  
Mullican, Edward M.  
Mulligan, Edward H.  
Mund, W. Allen  
Murphy, Ed. Jerome  
Murray, William E.  
Musacchio, Donatus  
Myers, Garrison Charles  
Myers, Howard M.  
Nadol, Samuel  
Nance, John B.  
Nicholson, Robert J., Jr.  
Nicolls, Robert A.  
Wilson, Walter J.  
Nizer, John  
Nixon, Lewis S.  
Noppenberger, George J.  
Norman, Eugene W.  
Norris, William  
North, E. Culver  
North, Leonard J.  
Null, Robert C.  
Oberry, Harry  
O'Brien, Bradley W.  
Ochs, Albert  
O'Conor, John J.  
O'Donovan, Wilbur  
Offut, Edward N.  
Ohlendorf, Vannerson  
Ohm, George H.  
O'Toole, John S., Jr.  
Packham, Eldridge T.  
Park, James D.  
Parker, William H.  
Parsons, Russell  
Paul, H. Earl  
Pearce, Thomas C.  
Peddicord, Everett D.  
Pennington, James H.  
Pennington, James W  
Perego, Chester A.  
Perkins, Carter R.  
Perring, Henry B.  
Perry, Meekin R.  
Peters, Clifford  
Peters, Edward J.  
Petri, Philip G.  
Pfeiffer, Albert W.  
Phillips, Carlton  
Phillips, Francis X.  
Pickel, George L.  
Pickus, Eli  
Pickus, Samuel  
Pierson, Edward D.  
Piwowar, Louis  
Platz, Edwin F.  
Pohlman, George W.  
Potterfield, Clifton W.  
Price, Lewis E.  
Primus, James J.  
Pritchard, William S  
Radcliffe, E. Warfield

- Radzissewski, John A.  
Raffel, Leon  
Randall, Roland E.  
Rasch, Harry B., Jr.  
Rea, Joseph  
Reddick, Marshall E.  
Reed, Walter H., Jr.  
Rehberger, Elmer H.  
Renner, John B.  
Reynolds, Paul W.  
Rhode, Walter A.  
Richardson, William L.  
Riedman, John H.  
Riley, Herbert D.  
Ritterman, Samuel H.  
Rittershofer, Ernest  
Robertson, Stuart F.  
Robertson, William F.  
Robinson, Thomas M.  
Roche, S. John  
Roddy, John  
Roedel, Edward W.  
Roesner, Ernest J.  
Rogers, Milton E.  
Rogers, William B.  
Romans, William A.  
Rommel, Thomas  
Romoser, Ellsworth R.  
Rosenberger, Reuben  
Rosenthal, Albert N.  
Rosenthal, Lewis D.  
Ross, Lorman Fauth  
Roth, Charles H.  
Rouse, Edward R.  
Rowe, Henry H.  
Royer, Wilson  
Rubenstein, Meyer  
Rupp, Morton J.  
Russell, Louis M.  
Russell, Merrill  
Russell, William E.  
Saal, Frank  
Sack, Edwin T.  
Sackett, August J.  
Sacks, Joseph  
Saffron, Edward M.  
Sanders, William B.  
Sappington, Roger J.  
Schabdach, Leonard  
Schaffner, Christian  
Schanfelter, Charles F.  
Scheidt, Charles H.  
Schloman, Frederick A.  
Schmidt, Edwin J.  
Schneider, Robert W  
Schneider, Walter F.  
Schneider, William W.  
Schofield, John C.  
Scholtz, Ernest E.  
Schreiber, Felix J.  
Schrodetzki, Bernard H.  
Schroenfeld, Benjamin  
Schuman, George H.  
Schwartz, Benjamin  
Schwartz, Isadore  
Scott, Ellicott  
Seeman, Frederick C.  
Seidman, Milton  
Seidenstricker, John C.  
Seiler, Herman O.  
Seim, Edward R.  
Seward, Albert B.  
Shannahan, Thomas D.  
Shaprow, Wesley H.  
Shaughnessy, Leroy T.  
Shell, William Verne  
Shelley, Clarence F.  
Shepard, Herbert N.  
Sheselsly, Samuel J.  
Shimp, William H.  
Shipley, Wallace W.  
Shook, Albert H.  
Simmonds, Carroll L.  
Simson, Maurice H.  
Slater, Norbert W.  
Smith, Henry B.  
Smith, Justus C.  
Smither, George T.  
Snack, Charles H.  
Snodgrass, J. Russell  
Snyder, Carroll R.  
Snyder, William H.

- Sopher, Aaron  
Spath, Harry  
Speert, Julius L.  
Stack, Joseph A.  
Stahl, Carroll G.  
Standiford, George M.  
Standiford, Winfield S., **3rd**  
Stark, Julius  
Stearns, Howard C.  
Steel, Leroy L.  
Stehle, John H.  
Steiner, Carl L.  
Steinitz, Albert  
Stenerson, James S.  
Stigler, Robert  
Stinchcomb, Harry W.  
Stranz, Reinhold Albert  
Strauss, Charles  
Strauss, Louis  
Street, Wilbur A.  
Stritehoff, Donald A.  
Stroehla, John, Jr.  
Stromenger, Wallace H.  
Strow, Edward L.  
Struven, Martin C.  
Sullens, James R.  
Sullivan, John L.  
Sumwalt, Charles E.  
Sweany, Donald I.  
Talbott, Earl G.  
Tamburo, Samuel J.  
Tanner, Otto F.  
Taylor, Harry E.  
Taylor, Howard A.  
Test, Wharton  
Thompson, Bruce  
Thompson, Charles R.  
Timberman, Clifford  
Timlin, Francis A.  
Townsend, Charles M.  
Tracey, John T.  
Tragesser, George  
Trax, Alan M.  
Treadwell, William B.  
Trumbo, Edward R.  
Turk, Richard H.  
Tuttle, Edward S.  
Twelbech, Edwin J.  
Twilley, Richard V.  
Tyson, Harry L.  
Vadala, Clifford E.  
Vail, Allison J.  
VanDyke, Edgar W.  
Varney, John H.  
Vickers, Lawrence L.  
Volk, Abraham  
Vonderhorst, Louis E.  
Waesche, Charles S.  
Wagoner, Charles D.  
Wahl, Raymond G.  
Wallis, Robert  
Ward, Lancaster S.  
Warner, Hubert E.  
Warner, R. Gordon  
Warrington, Harold M  
Waters, Charles R.  
Watkins, Harold M.  
Weikel, Henry C.  
Weiner, Abraham G.  
Weinstein, Leonard B.  
Weiss, Carl L.  
Weiss, Harold M.  
Weiss, Howard E.  
Welzant, Joseph W.  
Wensky, Stuart  
Whaley, Hambleton O  
Wheatley, Alfred W.  
Wheatley, Robert C.  
White, Donald W.  
White, Joseph L.  
White, Louis E.  
Whitlock, Frank W.  
Whittle, Philip A.  
Wickham, James J., Jr.  
Wiedefeld, Henry R.  
Wiesner, William E.  
Wilder, Earl L.  
Whiley, Arthur L.  
Wilkes, Milton R.  
Wilkinson, John W.  
Willgrubs, Irvin A.  
Williams, Edwin A.

Welner, Harry M.	Wright, J. Clyde
Wilson, Emory J.	Yaffe, Samuel
Wilson, John	Young, Hulbert, Jr.
Wilson, Mervin E.	Young, William James
Winder, George P.	Zaccaro, Spartaco
Wise, Brooks E.	Zaslanka, William J.
Wolfrom, Edgar Allen	Ziegler, John H.
Woodford, Marion J.	Zies, Theodore C. J.
Woods, Charles J.	Zimmerman, Allen W.

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## MID-YEAR CLASS OF 1924—244 MEMBERS

(“Dx” Class)

Abelson, Hyman	Corkran, John R.
Albert, Milton H.	Cotton, Harold M.
Alperstein, Samuel L.	Crane, William H., Jr.
Anderson, William G.	Cross, Vernon L.
Arnold, Allen J.	Davidson, Eugene F.
Ashley, Arthur J.	Davis, William Patrick
Askew, Ronald	Deems, Frank
Atkinson, Earl L.	Dennis, Kenneth H.
Bachtell, John H.	Dietrich, Adam
Baker, Percy W.	Dietrich, Henry B.
Ball, Frederick	Dietz, Stuart G.
Bartlett, Leslie J.	Doenges, John H.
Berger, Herbert	Downes, James
Bevans, Charles O.	Dorsch, Oscar
Bixler, Murray F.	Dudderar, Frank
Bley, Emil C.	Duffy, Leo
Bomberger, Arthur	Eaton, Warren J.
Bonwill, Thomas	Ehlers, Herbert O.
Brandau, Robert W.	Elfont, John
Bright, George F.	Ellerbrock, Gilbert
Broadbent, John	Ellerbrock, Herman
Brown, Burton C.	Escolopio, Michael
Bruning, Eugene	Eslinger, Earl
Buckmaster, Everett L.	Evans, William C.
Burdick, Wilson A.	Fedder, Herbert A.
Canitz, Fred. J.	Fiege, William H., Jr.
Carrington, Charles E.	Fifer, Hartje
Chestnut, George B.	Finkelstein, Samuel
Cizek, Frank	Finlay, Harold R.
Conant, Roger	Fisher, William E.
Conklin, Charles A.	Foreman, Irvin

- Ford, J. Geraud  
Fowler, George H.  
Friant, Charles H., Jr.  
Gallina, Samuel  
Gartner, Ernest T.  
Gerhman, C. John  
George, Colvin W. S.  
German, Edgar  
Gerry, James L.  
Gibson, Albert W.  
Ginsberg, Joseph  
Glutzkin, George  
Gosnell, Robert J.  
Grafflin, Frank W.  
Granger, Herford E.  
Greb, Albert  
Green, Angus McD.  
Grice, George L.  
Griebel, Edward C.  
Guth, Frank C., Jr.  
Guzankas, Adolph  
Hahn, Herbert  
Hall, Harry S.  
Hanington, Edward  
Hantman, Isaac  
Haughey, Thomas F. J.  
Hauver, Clifford C.  
Henck, William A.  
Hejnal, Stanley  
Hemmeter, George T.  
Herbert, Russell M.  
Hershey, Howard G.  
Hesser, James M.  
Hildebrand, Edgar L.  
Hiltz, Charles E.  
Hevell, Graham R.  
Hobbs, Edwin T.  
Hobbs, Henry E.  
Hockensmith, William G.  
Holland, Leo Laurence  
Houston, Henry H.  
Howard, Walter  
Hrebik, Frank C.  
Jarvis, H. O.  
Jenkins, Charles W.  
Joesting, Frank R.  
Jones, A. Llewellyn  
Jones, Harvey  
Jory, John G.  
Kahl, Christian H.  
Kaufman, Holden R.  
Keller, William E.  
Ketchan, John R.  
Kilmer, Calvin M.  
Korn, Leonard  
Knighton, William  
Kovermann, John W.  
Krebs, Louis A.  
Krekel, Hubert  
Kruger, John, Jr.  
Leatherbury, Richard  
Leeser, Russell A.  
Leibensperger, Carroll  
Leimkuhler, John Edward  
Leonard, Melvin N.  
Leonhardt, Harold  
Loane, Emmett  
Lipp, Walter J.  
Livezey, George Kessler  
Long, Charles A.  
Lorenz, Ralston  
Lott, Faion Eli  
Luckenbach, William S., Jr.  
McClure, William R.  
McCormick, Lawrence O.  
McCurdy, Samuel J.  
McKewin, Francis R.  
Maguire, Frank  
Marshall, J. Rouse  
Meade, Robert T., Jr.  
Meese, Norman W.  
Meyer, Edward  
Michel, Howard  
Miller, Carroll  
Miller, Donald  
Miller, Raymond B.  
Mohsberg, Sidney  
Molesworth, Vernon  
Monat, Robert L.  
Monfried, Louis  
Morton, Clinton  
Munro, Reginald W.

- Murray, Lawrence  
Myers, John A.  
Needle, Leon  
Newell, Eugene  
Ningard, Vernon S.  
Nixdorff, Louis S.  
O'Donnell, Jennings  
Oles, Wallace W.  
O'Rourke, George H.  
Paca, William, Jr.  
Padget, George W.  
Paige, Edwin C.  
Parker, William S.  
Parks, J. William, Jr.  
Paterson, Leroy A.  
Pawlik, Charles  
Perkins, E. Carter  
Petrik, Louis  
Pfeifer, Charles W.  
Pierson, Raymond H.  
Probst, Elery P., Jr.  
Purdy, Kenneth  
Rausch, Frederick H.  
Reamy, Robert L.  
Reed, Walter V.  
Reede, Chilcoat  
Reichert, Elmer  
Reichard, Irvin  
Rein, Charles L.  
Richards, Austin E.  
Richardson, Byron  
Richardson, Robert  
Rohde, John A.  
Roth, John F.  
Ross, Lorman Fauth  
Rowe, James W.  
Rukert, Harry G.  
Sabatino, Joseph  
Sakers, John W.  
Salvadore, Nicholas  
Saylor, Cromwell  
Schaefer, Alfred  
Schafer, Herbert P.  
Scheffennacker, Henry J.  
Scheidt, Vernon  
Schnable, William T.  
Schwartz, David I.  
Schwarz, William  
Scogna, Samuel  
Shaw, Arthur L.  
Shaw, Howard C.  
Sheats, Louis  
Sill, Gabriel DuV.  
Smails, Oswald C.  
Smalkin, Harry  
Smith, Elmer S.  
Smith, James  
Smith, William R.  
Snoops, Frederick G.  
Snyder, John M.  
Snyder, William D.  
Steele, Robert C.  
Stein, Leon  
Stevenson, Robert  
Stinchcomb, Emory L.  
Stissel, Carl F.  
Storrs, Basil D.  
Tawes, Charles M.  
Thomas, Richard H., Jr.  
Tucker, Samuel  
Vance, Joseph F.  
Tews, Robert W.  
Vivell, Allen E.  
Wasilfsky, Adolph M.  
Waddy, Charles W.  
Warfield, Hiram  
Watts, William C.  
Webster, Earle E.  
Weller, M. Talbott  
Wetzell, William F.  
Wilcox, Thornton  
Wooden, William, Jr.  
Wilson, Stanley A.  
Witmyer, Howard T.  
Wolfgram, Russell G.  
Wood, Irvin W.  
Wooten, Carl E.  
Wyatt, Wilfred P.  
Zamanske, Bernard  
Young, Frederick C.

**SUMMARY OF ENROLLMENT**

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Mid-Year Class of 1920.....	31
Class of 1920, "A" Class.....	151
Mid-Year Class of 1921, "Ax" Class.....	101
Class of 1921, "B" Class.....	191
Mid-Year Class of 1922, "Bx" Class.....	147
Class of 1922, "C" Class.....	407
Mid-Year Class of 1923, "Cx" Class.....	235
Class of 1923, "D" Class.....	747
Mid-Year Class of 1924, "Dx" Class.....	244
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Total enrollment.....	2,254

**CLASS ORGANIZATIONS****CLASS OF 1920—"A" CLASS**

<i>President</i> .....	John S. Ensor, Jr.
<i>Vice-President</i> .....	A. Douglas Stabler.
<i>Secretary</i> .....	H. Mayhew White.
<i>Treasurer</i> .....	Joseph B. Miller.

**MID-YEAR CLASS OF 1921—"Ax" CLASS**

<i>President</i> .....	R. Page O'Conner.
<i>Vice-President</i> .....	Eugene M. J. Callis.
<i>Secretary</i> .....	W. Sidney Bradfield.
<i>Treasurer</i> .....	Richard J. Chambliss.

**BOARD OF STUDENT ACTIVITIES**

It is the aim to conduct the student activities of the school under teacher supervision, so that the adage "All for each and each for all" may reach the maximum of realization. The student body is represented on the board by the presidents of the third and fourth year classes. The activities and their representatives are:

<i>At large</i> .....	The Principal and the Vice-Principal.
<i>Finances</i> .....	Mr. Bogue.
<i>Football</i> .....	Mr. Bowers.
<i>Baseball</i> .....	Mr. Watson.
<i>Track</i> .....	Mr. Anderson.
<i>Basket-ball</i> .....	Mr. Robinson.
<i>Lacrosse</i> .....	Mr. Brown.
<i>Marksmen</i> .....	Mr. Adams.
<i>Swimming</i> .....	Mr. Bowers.
<i>Tennis</i> .....	Mr. Hobbs.
<i>Soccer</i> .....	Mr. Bowers.
<i>Triangle Literary Club</i> .....	Messrs. Wills and Porter.
<i>Dramatics</i> .....	Mr. Porter.
<i>Cadet Corps</i> .....	Mr. Gambrill.
<i>Music</i> —	
<i>Vocal and Instrumental</i> .....	Mr. Hobbs.

**THE ORCHESTRA**

Notwithstanding the fact that music forms no part of the course of study, the Poly Orchestra is a leading activity of the school. There is always keen competition for its limited membership.

**Members.**

Raymond Ashley.....	<i>Piano.</i>
Isadore Becker.....	<i>First Violin.</i>
Carl E. Willoughby.....	<i>First Violin.</i>
Harry H. Long.....	<i>Second Violin.</i>
Henry Albert.....	<i>Second Violin.</i>
Fred Schmuff.....	<i>First Violin.</i>
Bernard Schwedel.....	<i>First Violin.</i>
Harold Maser.....	<i>Clarinet.</i>
William Seibald.....	<i>Flute.</i>
Osmar P. Steinwald.....	<i>Bass Violin.</i>
John B. Torsch.....	<i>First Violin.</i>
Adolph M. Lieder.....	<i>Saxaphone.</i>
Lawrence P. Schmidt.....	<i>First Violin.</i>
Harvey Hantman.....	<i>Cornet.</i>
<i>Director.....</i>	Mr. Jos. A. Jackowick.

### THE TRIANGLE CLUB

The three literary societies—the Lowell, the Poe, and the Franklin—were united at the beginning of the year 1917-1918 to form one society, the Triangle Club. The purpose of this society is to train its members in the conduct of a deliberative assembly, to give them an elementary knowledge of parliamentary law, and to afford them an opportunity for self-expression in debate and other forms of public speaking.

#### Officers.

<i>President</i> .....	Frederick L. Moehle.
<i>Vice-President</i> .....	M. Tracy Sonneborn.
<i>Secretary</i> .....	John Koch.
<i>Treasurer</i> .....	J. Walter Tottle.
<i>Sergeant-at-Arms</i> .....	Henry Hoffman.
<i>Student Critic</i> .....	Jus. T. Gold.
<i>Faculty Advisers</i> ..	Mr. Harry P. Porter and Mr. J. M. Dooley.

### "POLY LIFE"

The publication, *Poly Life*, is the result of a sentiment on the part of the students of the Baltimore Polytechnic Institute that the school should have a permanent journal which should be a means of circulating school news and be a medium of expression for those who desire to write.

In response to this sentiment, Paul I. Young, '19; T. Harold Revere, '20; Manuel L. Kann, '20, and E. Irvin Richardson, '20, organized a staff and issued the first number in December, 1918. The magazine is issued monthly, and its expenses are met fully by the receipts from subscriptions and advertisements.

The Staff for 1919-1920 is as follows:

<i>Editor-in-Chief</i> .....	Edward J. Schaefer, '20.
<i>Managing Editor</i> .....	Manuel L. Kann, '20.
<i>Sporting Department</i> .....	Carroll F. Small, '20.
<i>Assistants</i> .....	Howard V. Stehl, '23, and Edwin Hunt, '23.
<i>News Department</i> .....	Bernard Weiner, '20.
<i>Assistant</i> .....	Frederich Moehle, '21.
<i>Art Department</i> .....	William Rodgers, '21.
<i>Humor Department</i> .....	Spencer E. Sisco, Jr., '20.
<i>Assistant</i> .....	Horace Weihmiller, '20.
<i>Photography</i> .....	Spencer E. Sisco, Jr., '20.
<i>Assistant</i> .....	Carl A. Ganter, '23.
<i>Correspondent</i> .... <i>Western High School</i> : Annette Straus, '20.	
“	<i>Eastern High School</i> : Elsyne Wingate, '20.
<i>Critic</i> .....	Mr. George S. Wills.

#### Business Staff.

<i>Manager</i> .....	Mr. George H. Schwartz.
<i>Assistant Manager</i> .....	John S. Ensor, Jr., '20.
<i>Department Assistants</i> —	
<i>Advertising</i> : J. Nelson Stuart, Jr., '22; Lawrence C. Swain, Jr., '22; C. Oakford Newman, '22.	
<i>Circulation</i> : Allan M. Cleaveland, '21; Frederick H. Houck, '21; Reginald S. Rabins, '21; Douglas C. Turnbull, '21; Leroy Kern '20; and Sidney Kellner, '20.	

## BASEBALL

The Baseball Team of 1919 experienced the most successful season in the history of baseball at Poly.

The team not only won the High School Baseball Championship of the city, but it went through the entire season with only one defeat.

The first game was a tie with the Towson High. The second game, played with Mercersburg, resulted in a defeat, 6-0. The succeeding thirteen (13) resulted in victories.

This record will no doubt give the future baseball teams an incentive for action.

### The Schedule.

	<i>Poly</i>	<i>Opponents</i>
April 5—Towson High.....	2	2
April 6—Mercersburg Academy.....	0	6
April 13—Maryland School for Boys.....	10	3
April 18—Dunhams.....	13	1
April 19—Loyola.....	2	1 .
April 20—Army-Navy Preps.....	5	3
April 27—Episcopal High.....	6	2
May 3—Towson High.....	4	0
May 10—Hanover High.....	5	2
May 14—Camp Holabird.....	12	4
May 16—City College.....	8	4
May 19—Loyola.....	1	0
May 20—McDonogh.....	4	3
May 23—City College.....	1	0
May 24—Hanover High.....	9	2

**The Team.**

Kelly, J.....	<i>Second Base.</i>
Henschen, L.....	<i>Shortstop.</i>
Grace, H.....	<i>Third Base.</i>
Schieffer, C.....	<i>First Base.</i>
Bosley, A.....	<i>Center Field.</i>
Burgemeister, F.....	<i>Right Field.</i>
Brown, D.....	<i>Catcher.</i>
Ludwig, W.....	<i>Catcher.</i>
MacMillen, G.....	<i>Pitcher.</i>
Nisbet, A.....	<i>Pitcher.</i>

*Substitutes:* Goldsmith, H.; Welmon, W.; Hawthorne, C.

*Coach,* William D. O'Keefe.

*Manager,* William D. O'Keefe.

## FOOTBALL

Poly's 1919 Football season was highly satisfactory, although it was impossible to secure games with local teams. Our team met some of the best High School teams in the East and made a good showing against them. The games with Maryland teams were hotly fought and won. The game with City College was the best in years and kept all interested to the last. Although City made a wonderful fight, Poly won for the seventh consecutive year.

### The Team.

<i>First Team</i>	<i>Position</i>	<i>Reserves</i>
Henschen.....	L. E.....	Waesche
Slowik.....	L. T.....	Wehr
Milinausky.....	L. G.....	Taylor, M.
Prechtel.....	C.....	Duncan, Eppler
Auer.....	R. G.....	Newton
Primrose.....	R. T.....	Musselman
Callis.....	R. E.....	Horner
Neavitt, Taylor, J.....	Q.....	O'Conner
Kelly.....	L. H. B.....	Dody
Abbott.....	R. H. B.....	Lautenberger
Van Doren.....	F. B.....	Ritte

*Substitutes:* Krug, Ghent, Powell, Knecht, Wilson, Welmore, Hicks, McKinstry, Silver.

### The Record.

<i>Opponents</i>	<i>Score</i>	<i>Poly</i>
Mercersburg.....	19	0
Central High.....	14	0
Harrisburg Tech.....	85	0
Maryland State Freshmen.....	0	0
St. John's Reserves.....	0	20
City College.....	7	19
Johns Hopkins Freshmen.....	0	14

Gene Callis, *Captain*.

Frank Bowers, *Coach*.

S. Watson, *Manager*.

## LACROSSE

Poly was moderately successful in Lacrosse during the season of 1919. City College won a hard-fought game for the first time in four years.

### The Record.

Polytechnic.....	7,	Maryland State College.....	3
Polytechnic.....	5,	Maryland Stars.....	4
Polytechnic.....	4,	Johns Hopkins Reserves.....	4
Polytechnic.....	4,	Johns Hopkins Reserves.....	6
Polytechnic.....	3,	Baltimore City College.....	6

### The Team.

Taylor.....	Goal.	Van Doren...Third Defense.
Muzdakis.....	Point.	Sack, Sisco.....Center.
Cornbrooks, Smith..C.	Point.	Turnbull.....Third Attack.
Neavitt.....	First Defense.	O'Conner....Second Attack.
Schwarz....	Second Defense.	Melamet.....First Attack.
Kutzleb.....	Second Defense.	Norris .....Out Home.
	Darley (Capt.)....	In Home.

*Substitutes:* Chambliss, Duncan, Brown, Sack, Milanowsky, Stabler, Clark, McKinstry, Rodeman, Bortner, Wehr, Dawson, Brumble, Robinson, Bergin, Houck, Knipp, Welch, Pledge.

## TRACK

The 1919 Poly relay team was successful in winning national scholastic honors for the second consecutive year.

The relay team, composed of William F. Andrews, Joseph C. Thompson, Eugene Callis, H. Clay Dodson and J. Ellis McPhail, won the high school relay championship of America at the University of Pennsylvania Relay Carnival. The same team distinguished itself by winning the following-named events: The mile high and preparatory school relay championship of the Metropolitan District, the New England District, and the Middle and South Atlantic District.

The Poly track team won the following-named events: The Annual Tome Interscholastic Meet, the Poly-City Dual Meet and the City Championship Meet of the Public Athletic League. In the State Olympiad the Poly track and field representatives were the chief factors in winning the State Scholastic title for Baltimore City.

A new record,  $52\frac{3}{5}$  seconds, was established by Joseph C. Thompson at the City Championship Meet in the 440 yards run.

A new record, 3 minutes  $35\frac{3}{5}$  seconds, was established by the Poly relay team at the Meadowbrook Games in the one mile relay race.

The official "P" and star were awarded to William F. Andrews, Joseph C. Thompson, H. Clay Dodson, Eugene Callis, J. Ellis McPhail and J. Marshall Boone.

The official "P" was awarded to William Cullimore and Jacob N. Opie.

## BASKETBALL

The season of 1918-1919 was a banner year in basketball. The record of the team stands out as the best in the history of the school. Financially, the season was equally as good. The team has been handicapped in having no floor of its own, and it is hoped that we will have our own gymnasium in the near future.

### The Team.

Machamer, Geo.....Forward. Gardner, Alan.....Center.  
 Darley, Geo.....Forward. Powell, Ralph.....Guard.  
 Henschen, Leroy.....Guard.

*Substitutes:* Irvin Cook, Lester Scott, Kenneth Mullan.

### The Record.

Polytechnic..56,	Donaldson School.....	7
Polytechnic..44,	McDonogh School.....	19
Polytechnic..39,	Blue Ridge College.....	23
Polytechnic..10,	Loyola High School.....	31
Polytechnic..44,	Hopkins S. A. T. C.....	20
Polytechnic..27,	Baltimore Friends' School.....	13
Polytechnic..24,	McKinley M. T. School (Washington) ..	20
Polytechnic..25,	Central High School (Washington) ..	8
Polytechnic..32,	McDonogh School.....	24
Polytechnic..11,	Baltimore City College.....	22
Polytechnic..20,	Loyola High School.....	39
Polytechnic..25,	Baltimore Friends' School.....	19
Polytechnic..28,	Baltimore City College.....	17
Polytechnic..22,	Tome Institute.....	9
Polytechnic..38,	Blue Ridge College.....	18
Polytechnic..27,	Baltimore City College.....	18

## SWIMMING

The 1919 Poly swimming team had a successful season. The meet with Mercersburg was hotly contested, our team showing up well.

Poly won second place in the South Atlantic Amateur Athletic Union Meet.

The dual meet with City College featured the season, Poly winning by a small margin.

The work of Sheil, Wessels, Prechtel and Boone was very good.

Edward Sheil, *Captain*.

Frank Bowers, *Manager*.

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## SOCCEr

**1919-1920**

While Soccer is a new branch of sport played at Poly, our boys developed a strong team under the guidance of Captain Bosley. We played practically all local teams and the games were in all cases close, neither team winning by a large score.

Our next season should be very successful.

*Captain*, A. Bosley.

*Manager*, F. Bowers.

### THE CADET CORPS

The Poly Cadet Corps was organized in November, 1915, chiefly through the instrumentality of Col. Clarence Deems, U. S. A., retired, a member of the Board of School Commissioners. The organization is that of a battalion of three companies, the whole under the direction of a member of the teaching staff. Uniforms for 175 have been provided, and Krag-Jorgensen rifles for 100 have been loaned by the U. S. Government.

The spirit of the organization is excellent, but its size is not commensurate with that of the school, due to the lack of uniforms and equipment.

#### Battalion Organization.

*Major* ..... Leroy W. Kern.

#### COMPANY A

*Captain* ..... Lee J. Zollman.  
*First Lieutenant* ..... Louis H. Will.  
*Second Lieutenant* ..... Harry H. Tormey.

#### COMPANY B

*Captain* ..... Sidney G. Kellner.  
*First Lieutenant* ..... James W. Thomas.  
*Second Lieutenant* ..... William F. Smith.

#### QUARTERMASTERS' DEPARTMENT

*First Lieutenant* ..... Jacob Kornblatt.  
*Battalion Q. M. Sergeant* ..... James E. Sunderland.  
*Director* ..... Mr. H. Nelson Gambrill.  
*Assistant Director* ..... Mr. Herbert E. Fankhanel.

## ELIGIBILITY RULES

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On March 12, 1914, the Principals of the City College and the Polytechnic Institute, the two male secondary public schools of Baltimore, agreed upon a code of rules which shall govern the eligibility of students of the two institutions to participate in athletics and in other competitions.

### The Code.

1. Only those students who maintain a grade of scholarship satisfactory to the Principal shall be permitted to represent the school in any competition.
2. No student who has reached his twenty-first birthday shall represent his school in any competition.
3. No student under the penalty of discipline shall represent his school in any competition.
4. All post-graduates are ineligible for competitions, and no undergraduate shall be eligible for a longer period than four years from the date of his original entry, unless his graduation has been prevented one year by absence on account of sickness.
5. Only those students who are taking full work in a regular course (a minimum of 15 periods per week) shall be eligible to represent their school in any competition.
6. Only those students who are in good standing as amateurs shall represent their school.
7. The Principal of each school shall be held to have ultimate responsibility for the representatives of his school in all matters concerning inter-school contests.
8. All games shall be played on Fridays, Saturdays, or on weekday holidays.
9. All schedules and arrangements for competitions shall be made by members of the teaching staffs of the two institutions, and all officials shall be selected at least two days before a contest.
10. A member of the teaching staff shall manage the finances.
11. A student who does not attain a standard of attendance satisfactory to his Principal may not participate in any contest.
12. A student who enters school later than October 8th must have attended two months before becoming eligible to participate in any contests of competitions.
13. Each Principal shall supply the other within three days of the date of any competition a list of the regulars and substitutes whom it is proposed to use.
14. In all cases of students entering from other secondary schools, their records in such schools shall determine their eligibility in accordance with these rules.
15. February entrants, unless they come from other high schools or by promotion from the elementary schools, are ineligible to contest until the following September.

**CATALOGUE OF GRADUATES**

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**CLASS OF '87.**

Clarence G. Boujs,  
George C. Bump,  
Lucian Dallam,  
Otto H. Ehlers,  
Osmar K. Gardner,  
Herbert F. Gorgas,  
Joseph Greenbaum,  
Henry W. Hahn,  
Minor, F. Heiskel,  
Robert Hooper,  
William S. Hugg,  
Thomas J. Irons,  
Joseph H. Kuehn,

P. Charles Nelson  
Flavius J. Pennington,  
Richard Piez,  
Henry M. Price,  
Walter G. Reinicker,  
William A. Robertson,  
Albert Rosenberg,  
James B. Scott,  
Walter R. Sweeney,  
James C. Thompson,  
Adolphus Tiemeyer,  
Frederick H. Wagner,

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**CLASS OF '88.**

Arthur O. Babendrier,  
Edward Binswanger,  
Bernard H. Brooke,  
Sidney S. Bois,  
Julius Fireman,  
Thomas G. Ford,  
George M. Gaither,  
John H. Harvey,  
Howard Harvey,  
Walter J. Herman,  
Joseph H. Hooper,  
John P. Jefferson,  
William Johnson, Jr.

William Mencke,  
William F. Mylander,  
Edwin F. Orem,  
Edward B. Passano,  
George E. Repp,  
Harry E. Roberts,  
George C. Robinson,  
Hanson Robinson,  
Robert E. Rogers,  
George H. Sickel,  
Washington B. Stanton,  
Orlando C. Weeks,

## CLASS OF '89.

William F. Ackerman,	Charles C. Constantine,
Samuel R. Adams,	Albert T. Barrett,
Morgan H. Baldwin,	John L. Ehrman,
Arthur Gordon,	Allyn Field,
Ernest Griffith,	Howard Crosby,
Isaac Behrend,	George W. Moog,
Joseph Isaac,	John K. Mount,
Louis H. Gerdig,	Robert W. Peach,
Harry M. Ford,	Charles E. Phelps, Jr.,
Edward P. Cromwell,	William G. Robertson,
John S. Hand,	Robert C. Round,
Claiborne M. James,	Myron S. Rose,
Albert C. Layman,	William C. Siegmund,
Charles W. Leach	Joseph Stiefel,
J. W. C. Meikle,	Harry P. Suman,
Rozier L. Bouis,	Carroll Thomas
Robert H. Bushman,	

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## CLASS OF '90.

John F. Abendschein,	E. C. Harris,
G. S. Barnes,	J. C. Mattoon,
J. H. Bokee,	John D. Pugh,
J. Edward Broadbelt,	A. O. Robertson,
W. H. Farinholt,	William F. Schultz,
Chris. Feick,	Michael D. Schaefer,
J. Froelich,	William P. Shriver,
William P. Gundry,	Theodore Straus.

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## CLASS OF '91.

Walter Amos,	Samuel McNeal,
Basil Benson,	James C. Phillips,
William Benson,	Herbert M. Reese,
William Boucsein,	Edmund W. Robinson,
Morde Bren,	Reuben Row,
John J. Caine,	Warren S. Seipp,
George Dannetel,	N. D. D. Sallers,
Charles Ehlers,	Richard S. Warner,
Ferdinand B. Keidel,	William A. Young.
I. Edgar Knipp,	

## CLASS OF '92.

Edwin P. Antes,	Royal R. Duncan,
John P. Baer,	Charles R. Durling,
Frank J. Borie,	Isidor Deutsche,
B. Harrison Branch,	Walter H. Eisenbrandt,
Leonard Burbank,	William T. Holmes,
William C. Butler, Jr.,	J. C. Miller,
Frank B. Hooper,	Joseph Mullen,
Edgar N. King,	William H. Rose,
John Langford,	Albert G. Singewald,
Louis Liepmann,	William H. Soine,
R. M. Miller,	William E. Straus.
J. W. Dawson, Jr.,	

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## CLASS OF '93.

Theodore H. Ackerman,	James F. McShane,
Herbert Addison,	Clarence F. Morfit,
Oregon R. Benson,	F. H. Phelps,
Percy Thayer Blogg,	Edwin Schenck,
C. Raymond Carson,	John R. Uhler,
William John Cochran,	L. Lsmay Van Horn
B. C. D'Yarnett,	Charles P. Weishampel,
Henry M. Fitzhugh,	R. L. Williams.
Clarence S. Hand,	

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## CLASS OF '94.

Edward H. Bell,	Horace J. Miller,
Albert E. Bowen,	Louis Mueller,
J. Straith Briscoe,	George M. Parlett,
Harry Cotont,	Charles Schlicker,
Carroll Edgar,	Alan P. Wilson,
Frederick Kopp,	John Zeubert,
Philip Littig, Jr.,	Pliny Culter Hall,
Thomas Q. McGinn,	Edward J. Herring.
Herbert A. McGaw;	

## CLASS OF '95.

George W. Brown,	Ward P. Littig,
Clifton A. Coggins,	Alfred F. Loeser,
Harry W. Francis,	Thomas J. H. Magness,
Graham B. Hall,	Herman F. Myer,
William W. Hogendorp,	George N. Rogers,
Albert J. Hooper,	Hamilton D. Ruth,
Frank A. Hornig,	Richard F. Weishampel,
Edward M. Likes,	Carl A. Witthaus.

---

## CLASS OF '96.

Samuel Hosea Armstrong,	Leon Alvyn Kohn,
Howard Douglas Bennett,	Erich Albert Loeser,
James Gomelia Boss, Jr.	Henry Louis Mencken,
William A. Boykin, Jr..	Harold Vincent Patterson,
Robert Lemmon Burwell,	Harry Clay Powell, Jr.,
Harry Parr Diggs,	Gilmor Meredith Ross,
Frederick L. H. Glendmeyer,	Thomas Quincy Scott,
William Howard Hamilton,	Henry Boon Silverton,
Arthur W. Hawkes, Jr.,	William Henry Smith,
F. Worthington von Stein,	Roscoe Conklin Sweeny,
Louis Kemp Henninghausen,	Charles Edwin Wilson,
Harry Louis Homer,	Olin Alexander Wilson.
Ludford Cohoon Jones,	

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## CLASS OF '97.

Louis Fabian Bachrach,	Chester Waters Larner,
Alan Marion Bennett,	Howard Osgood Preston,
William Melvin Carter,	George Gottlieb Schnepfe,
Elvin Griswold Cromwell,	Frederick Lewis Schwartz,
John Towson Elsroad, Jr.,	Joseph Stewart Smith, Jr.,
John Montgomery Gambrill,	Joseph Morrison Sparks,
Ernest Cummings Hatch,	Wilson Ward.
William Hain Kirwan,	Douglas Alan Sparks,
Harry L. Kugler,	

## CLASS OF '98.

Thomas Jefferson Andrews,  
Alan Joseph Bachrach,  
Leo Bauersfeld,  
Wilbur McKnew Bosworth,  
Frederick D. Dollenberg, Jr.,  
Romulus Griffith Doyle,  
John Howard Flayhart,  
Henry Galloway,  
Charles Raymond Gantz,  
Samuel Thomas Griffith,  
Alfred Cummins Hatch,  
William Herman Hubers, Jr.,  
Joseph Lowrie Ingle, Jr.,  
John Scott Longnecker,  
John Walter McGreevy,

Edward Harris Mealy,  
William Charles Metcalf,  
John Floyd Miller,  
William Eldred Nolan,  
Gurdon Tyler Pollard,  
Walter Percy Poole,  
John Maurice Rehberger,  
John McCollough Rife,  
Harry Rufus Ruse,  
Paul Edward Schaun,  
John Henry Sirich, Jr.,  
John Smith,  
Herbert Turner Snyder,  
George Creamer Wilcox,

## CLASS OF '99.

Charles E. Allen,  
William B. Boettner,  
Harrison Brent,  
Hugh W. Brent,  
Edward Goodnow Clayton,  
Edward P. Cooke,  
Charles C. Crockett,  
William W. Cushing,  
Arthur Councilman Davis,  
Charles H. Demitz,  
Roland S. Focke,  
Harry B. French,  
Robert B. Harper,  
Charles W. Held,  
Ira Johnson,  
George A. Knapp,  
Walter B. Lang,  
Harry Lowenthal,

George P. McCeney,  
William E. McCord,  
Marion H. McCoy,  
Charles E. Mencken,  
Charles T. Owens,  
Edw. L. Schaun,  
Harold B. Vincent,  
Joseph A. Ward,  
Charles C. Lucke,  
John N. McCleeter,  
Blakely A. McDonnell,  
Edwin G. O'Connor,  
William Taylor Phipps,  
Emanuel J. Sedlacek,  
Frederick C. J. Sternat,  
Joseph R. Walter,  
William C. Whelan.

## CLASS OF '00

John Walter Fred. Blizzard,  
 Roy Stevenson Houck,  
 Galt Fayette Parsons,  
 Gustav Frederick Linck,  
 Horace Kirk Faust,  
 Thomas Osborn Wensleben,  
 Samuel Moore Johnson,

Luther Chase Wright (see '08),  
 Walter Bowen Buttner,  
 Morgan Moore,  
 John Charles Maspoust,  
 Walter Groverman,  
 Lawrence Gunton Allbutt,

## CLASS OF 01

Joseph M. Beehler,  
 C. Ernest Conway,  
 William M. Demitz,  
 Charles F. Goob,  
 Richard G. Harris (see '05),  
 Irving C. Hess,  
 Charles W. Hoppert,  
 Carlisle L. Hubbard,  
 Edward E. Johnson,  
 Thomas H. Kenny,  
 Charles E. Lane,  
 Andrew J. Lowndes,  
 Ross E. Lynch,  
 Allen L. Malone,

Richard E. Marston,  
 Harry Mehrling,  
 John A. Raidabaugh,  
 T. Warden Rinehart,  
 William B. Rosenthal,  
 Edward Samuel,  
 John C. Siegle,  
 Walter H. Tapman,  
 Sidney C. Vincent,  
 George P. von Eiff,  
 Ernest B. Walton,  
 Arthur S. Weiss,  
 George K. Yost,  
 Philip H. Zipp.

## POST-GRADUATE CLASS OF '02

(Four Year Course)

Joseph M. Beehler,  
 C. Ernest Conway,  
 Irving C. Hess,  
 Andrew J. Lowndes,  
 Allen L. Malone.

John A. Raidabaugh,  
 Sidney C. Vincent,  
 George P. von Eiff,  
 Philip H. Zipp.

## CLASS OF '02

Joseph A. Baldwin,	I. Seeley Jones,
Frank O. Boyd,	D. Frank Lamble,
John B. Cautley,	LeRoy M. Langrall,
Robert Dall,	H. Quimby Layman,
William L. De Baufre,	John G. M. Leisenring,
John K. Flick,	William N. Michael,
Walter M. Gieske,	Charles A. Pettit,
Donald S. Hayes,	William S. Samuel,
Joseph T. Henthorn,	G. Forney Shyrock,
John S. Hess,	Charles F. Yardley.

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## POST-GRADUATE CLASS OF '03

(Four Year Course)

John B. Cautley,	I. Seeley Jones,
Robert Dall,	LeRoy M. Langrall,
William L. De Baufre,	H. Quimby Layman,
John K. Flick,	Specials—
Walter M. Gieske,	Arthur C. Davis,
Donald S. Hayes,	Charles A. Pettit,
John S. Hess.	

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## CLASS OF '03

Elmer Armiger,	Edward Hering,
Paul Backhaus,	Charles E. Herth,
Oscar F. Benjamin,	James B. Jones,
Owen C. Blades.	Milton Kraemer,
Harry N. Brannan,	Herman Lucke, Jr.,
Frank B. Burton,	Edmund C. Lynch,
William N. Crisp,	Arthur B. Mason,
John W. Dorsey, Jr.,	Harry M. Mason, Jr.,
Christopher J. Frank,	Sidney Newhoff,
Milton H. Gross,	Manley P. Northam,
Harold M. Parsons,	August H. Schaaf,
Ernest M. Poole,	Howard I. Schultz,
J. McDonnell Reid,	George F. W. Sims,
Martin J. Reynolds,	Wilmer T. Stone.

## POST-GRADUATE CLASS OF '04

## (Four Year Course)

Paul W. Backhaus,	J. McDonald Reid,
Harry N. Brannan,	Martin J. Reynolds,
William N. Crisp,	George F. W. Sims,
Edward Hering,	Specials—
James B. Jones,	Frank B. Burton,
Milton Kraemer,	H. Milton Gross,
Harry M. Mason, Jr.,	August H. Schaaf.

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## CLASS OF '04

Chester A. A. Albrecht,	Herman W. Lasser,
James B. Arthur,	Daniel J. Leary,
Marion V. Bailliere,	Leon Marmor,
Joseph Bowes, Jr.,	Samuel May,
Andrew K. Brumbaugh,	John L. Mosher,
Clarence C. Clickner,	Charles P. Nieder,
Edward C. Cromwell,	Robert G. Pangborn,
Frederick L. Dixon,	Massimo Pisani, Jr.,
Charles A. Edel,	George S. Robertson,
Frank B. Fifer,	George M. G. Schaefer,
Emanuel Fritz,	Leon Small,
George Gittelsohn,	Oscar E. Smith,
J. Lyell Gressitt,	Marion Steinberger,
Edward J. Hecker,	Harry DeG. Thurlow,
John H. Hills,	Harry Waldorf,
Harry J. Hodes,	Charles W. Whittle,
Benjamin F. Hoffacker,	Edwin L. Wilson,
Harry V. D. Hunt,	Louis A. Witte,
William C. Hurley,	William P. Wittmer,
Charles A. Langrall,	Alexander H. Woollen.

## POST-GRADUATE CLASS OF '05

Chester A. A. Albrecht,  
James A. Arthur,  
Joseph Bowes, Jr.,  
Edward C. Cromwell,  
John W. Dorsey, Jr.,  
Charles A. Edel,  
Frank P. Fifer,  
Emanuel Fritz,  
J. Lyell Gressitt,  
Richard G. Harris,  
Edward J. Hecker,  
John H. Hills,  
Benjamin F. Hoffacker,  
  
Harry V. D. Hunt,  
Charles A. Langrall,  
Samuel May,  
John L. Mosher,  
Robert G. Pangborn,  
Massimo Pisani, Jr.,  
Leon Small,  
Marion Steinberger,  
Harry DeG. Thurlow,  
Harry Waldorf,  
Edwin L. Wilson,  
Alexander H. Woollen.

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## CLASS OF '06

H. Roy Anderson,  
Moses Appel,  
Walter K. Bachrach,  
Harry C. Becker,  
J. Ralph Bolgiano,  
William Wallace Boyd,  
G. Herman Carl,  
Willis B. Clemmitt,  
Charles H. Dorsey,  
George Erck,  
Harry C. Finck,  
Edwin Friese,  
John R. Guttmann,  
John R. Haswell,  
Charles W. Henderson,  
George F. Meubrook,  
Ralph Holbrook,  
Andrew C. Kemler,  
Howard G. Lanahan,  
George F. Lehmann,  
Frank T. Leilich,  
  
Harold M. Lewis,  
Bernard A. McAbeef,  
Carl F. Meyer,  
Sidney D. Mitchell,  
Ferdinand Oppenheimer,  
John G. Pertsch, Jr.,  
Lewis W. Porter,  
John T. Ridgely,  
John C. Schirmer,  
Edward K. Stembridge,  
David B. Stewart, Jr.,  
Levin H. Stewart,  
Israel E. Stolberg,  
Frank T. Suman,  
Nicholas C. Thalheimer,  
Raymond M. Weaver,  
George F. Wennagel,  
George F. Weighardt,  
Phillip H. Williamson,  
Walter B. Wills.

## CLASS OF '07

Theodore Ascherfeld,  
Ludwig Aull,  
Emil G. Bauersfeld,  
R. M. Bealer,  
Alvin M. Bland,  
Gustav Bornscheuer,  
J. Daniel Brendel,  
John N. Childs,  
Wilmer A. Dehuff,  
C. Lehman Downs,  
Herbert S. Fairbank,  
F. Donald Fenhamen,  
Otto A. Geumann,  
Charles E. Grimes,  
Henry R. Gundlach,  
G. Herman Guttmann,  
Carroll R. Harding,  
William Hartman,  
Horace K. Hayden,  
Harry L. Hess,  
F. Merill Hildebrandt,  
Fernando Janer,  
Harry B. Joyce,  
John P. Kenney,  
Charles Krausse,

W. H. Kruger, Jr.,  
William G. McLaughlin,  
Laurance F. Magness,  
J. C. Manning,  
Lawrence G. Miller,  
Charles E. Mitchell,  
Serafin M. Montesinos,  
George T. Mumma,  
Marcus Newhoff,  
Samuel P. Nixdorf,  
Arthur Norden,  
Edwin H. Nordmann,  
Charles J. Rasch,  
Charles J. Ritterhoff,  
Ernest Rodemeyer,  
Arthur H. Schultz, Jr.,  
Nelson Schuster,  
Frederick B. T. Siems,  
V. Bernard Siems,  
Charles Silver,  
Samuel F. Tapman, Jr.,  
T. Leonard Walter,  
Bernard Wich,  
R. Mason Wilhelm,  
Julius Zieget.

## CLASS OF '08

Otto E. Adams,  
Gelston H. Armstrong,  
Charles P. Bolgiano,  
Gilbert F. Bolgiano,  
Emmet B. Bryan,  
Joseph D. Bullock,  
Nathan R. Butler, Jr.  
Walter S. Byrne,  
James R. Carroll, Jr.  
Thomas D. Conn.,  
Percy Davenport,  
Franklin Davis,  
Arturo Diaz,  
Austen Gailey,  
Frank Goldenberg,  
Eugene E. Graham,  
T. Douglas Gresham,  
R. Milton Hall,  
Walter L. Heathcote,  
Walter F. Heise,  
Harry C. Hess,  
Harry W. Hill,  
Milton A. Hodes,  
Abraham A. Hollander,  
Henry J. Horn,  
Raymond H. Hoskins,  
Henry A. Israel,  
Wilbur C. Jackson,  
Manual Janer,  
Charles R. Justi,  
Laurence A. Kahn,  
Walter E. Lee,  
Andrew H. Lemmon,  
Andrew W. Lieberknecht,  
Thomas W. Manning,  
Richard C. Meyer,  
Robert E. Palle,  
Mitq'hell W. Price,  
James P. Ray,  
Norman G. Reinicker,  
Herbert B. Reynolds,  
Norman F. Rigor,  
Edwin Rolker,  
Raymon Schlegel,  
Christian Schluderberg,  
Othello Schroedl,  
Arthur G. Schuster,  
Otto Sima,  
Benjamin F. Starr, Jr.,  
Milton D. Swartz,  
Walter M. Troll,  
Henry Vogt,  
Romaine G. Waltenberg,  
Carl C. S. Walter,  
Luther Chase Wright,  
Fréderick A. Zscheuschler.

## CLASS OF '09

Frederick B. Abbott,  
Oscar M. Bloch,  
George C. Borst,  
Frederick Burggraf,  
Carlton D. Cann,  
Douglas C. Corner,  
Harry W. Crist,  
William Dalrymple,  
Louis A. Deliz,  
Frank Fahm, Jr.,  
Clarence J. Flayhart,  
Roy D. Fleckenstein,  
George C. Fultz,  
H. Nelson Gambrill,  
Wilson N. Gambrill,  
Rafael Garcia,  
G. Stewart Giles,  
John Glaeser, Jr.,  
William T. Hanzsche, Jr.,  
Elmer Heubeck,  
Walter E. Higham,  
James R. E. Hiltz,  
William Vernon Hipsley,  
Franklin E. Holland,  
Adam W. Jahn,  
Arthur Janushek,  
Ernest F. Knabe,  
Roger C. Knipp,  
Gibbs LaMotte,  
William D. Lambdin,  
G. Bernard Lohmuller,  
William J. Mason,  
R. Brooke Maxwell,  
Henry C. A. Meyer,  
Julius O. Mirski,  
Emory H. Niles,  
Walter F. Perkins,  
Frederick L. Purdy,  
Herbert C. Randall,  
Paul Rosenthal,  
G. William Schindhelm,  
D. William Shilling,  
Harry B. Siegmund,  
Ernest Southerington,  
John Snyder,  
Frederick C. Stauffen,  
William F. Tapking, Jr.,  
Leroy K. Thompson,  
H. Belin Tinges,  
Manuel L. Vincente,  
Herbert L. Weaver,  
Bertram S. Winchester,  
J. Edward Yewell.

## MID-YEAR CLASS OF '10

George E. Gerlach,  
George E. Green,  
Frank Hermann, Jr.,  
E. M. Kennard, Jr.,  
Alfred Nisbet,  
Carl K. Schulte,  
John Louis Siems,  
Morris Arthur Spamer,  
George J. Sturmelsz, Jr.,  
Wilbur Nicholas Van Sant,  
Philip Waldschmidt,  
John F. Wannenwetsch,  
Russell D. Welsh,  
C. A. Yockel.

## CLASS OF '10

Robert E. F. Aler,  
William H. Barnard, Jr.,  
Ralph G. Bittle,  
Leo Blankman,  
Jacob Blaustein,  
Howard F. Carr,  
Laurence B. Chenowith,  
Herbert A. Ehrman,  
Ernest W. Eickelberger,  
Franklin C. Eleder,  
George B. Farlow,  
George E. Finck,  
Charles V. French,  
August P. Gompf,  
Carroll T. Harris,  
Parr Hooper,  
Charles R. Johnson,  
George Johnson,  
William B. Johnson,  
Edwin F. Koester,  
Robert W. Kroeger,  
August J. Kutzleb,  
Joseph H. Letzer,  
Lewis W. Link,  
Thomas M. Linthicum,  
William H. Long,  
Edward D. Lynch,  
Howard B. Lyon,  
William E. McComas, Jr.,  
Louis Mardaga,  
Eugene D. Milener,

Charles W. Miller,  
William N. Neibich,  
Dudley F. Nicholas,  
Frank Neumann,  
John B. Norris, Jr.,  
Edgar Parrish,  
Abbott L. Penniman,  
Ferd. H. Plack  
Edwin A. Plitt,  
Henry R. Rausch,  
Charles M. Reed,  
Richard G. Reese,  
Arthur Rhoads,  
John K. Ruff,  
Albert H. Samuel,  
Henry F. Schneider,  
Jacob Schmidt, Jr.,  
L. Wilson Scott,  
Charles L. Steel,  
George W. Tall, Jr.,  
Perry M. Teeple,  
Carroll A. Tunrner,  
Leo Tyser,  
Charles P. Vogel,  
M. Leeson Walsh,  
Frank I. Wheeler,  
F. Carey Williams,  
John A. Woodfield,  
P. Chancellor Wroe,  
Roy A. Yingling.

## MID-YEAR CLASS OF '11

Alois Baer,  
Ira L. Berg,  
E. Ellsworth Hall,  
Frederick Hall Jones,  
George W. Kelly,  
John L. Krausz,

John A. Lindner,  
Charles L. Linhardt, Jr.,  
Charles L. Mass,  
Samuel P. Stewart, Jr.,  
Jay W. H. Stoudenmire,  
Eugene L. Wolfe.

## CLASS OF '11

- John B. Adt,  
Wilmer E. Bader,  
Wilson T. Ballard,  
Gordon J. Barry,  
Charles P. Bartgis,  
J. G. Bauernschmidt,  
Charles F. Bevan,  
George W. Black,  
John Bohnlofink,  
Alan F. Bristor,  
W. C. Brooke,  
Landon M. Brooks,  
William T. Brooks,  
Walter A. Brown,  
Charles S. Burlingham, Jr.,  
J. Ford Coursey,  
Charles R. Cox,  
Edgar H. Dix, Jr.,  
G. Middleton Edwards,  
Howard H. Elliott,  
J. George Foster, Jr.,  
Donald Frames,  
Benjamin Goodman,  
Leroy S. Green,  
S. T. W. Green,  
J. Frederick Gross,  
Simon Halle,  
Arthur F. Holston,  
Harry B. How,  
Robert E. Kaestner,  
J. Dennis Kavanagh,  
Claude W. Keefer,  
Frederick M. Kipp, Jr.,  
Samuel J. Krotee,  
Owens Laws,  
Arthur B. Leonard,  
Sigmund J. Leskawa,  
George R. Loftus,  
Christopher E. Loos,  
James H. McKay,  
Edwin R. McLaughlin,  
Walter Mason,  
Samuel H. Mazer,  
Herbert W. Meini,  
Theodore H. Morrison,  
Frank A. Nickals,  
William B. O'Connor, Jr.,  
George C. Pfaff,  
William E. Pinschmidt,  
Milton A. Polster,  
Charles W. Price,  
Herman M. Raushenbach,  
William G. Richardson, Jr.,  
Ernest F. Ritterhoff,  
Gordon Robinson,  
John J. Rodemeyer,  
Ernest C. Schaun,  
John F. Sendelbach,  
Aaron L. Shalowitz,  
John Shoolbred, Jr.,  
W. Carlton Short,  
Alfred B. Smith,  
G. Nelson Sohl,  
J. Henderson Spafford,  
Carl E. Spott,  
George W. Steinmetz,  
Willard W. Troxell,  
W. Ellwood Vail,  
Otis G. Wilbur,  
L. Earl Wilson,  
L. Victor Winchester,  
Harry M. Wood,  
Conrad Zieget, Jr.,  
Julius O. Ziegfeld.

## MID-YEAR CLASS OF '12

John G. Boob,	F. Harrison McCarthy,
Oliver Boucher,	William F. O'Connor,
John J. Clancy, Jr.,	Fred Michel,
T. Earl Cooper,	William J. Parrott,
James A. Cullen,	G. Harvey Porter,
Paul R. Dankmeyer,	Walter F. Quast,
Paul Darrington,	Harry Schad,
Frederick T. Goetze,	Edward C. Siebert,
Cyrus J. Kearney,	William T. Snyder,
Milton Kemp,	Abraham Tobias,
Henry F. Krumm,	Paul H. White.
Paul L. Lotz,	

## CLASS OF '12

William C. Andrae,  
R. Nelson Atwell,  
John Becker,  
George Beneze,  
Clarence Birnbaum,  
Lyle H. Burton,  
W. Logan Cassell,  
Howard W. Chew,  
Davis J. Cloward,  
Hyman A. Cohen,  
Mark S. DeHuff,  
Charles E. Dennis,  
Richard P. Drenning,  
Samuel H. Eby,  
Thomas S. Eichelberger,  
Howard Elliott,  
C. Clinton Emigh,  
H. Stockton Ewell,  
J. Carroll Finnian,  
C. Edwin Fitzell,  
Albert Frey,  
Harry Fried,  
Arthur D. Fulton,  
Alfred M. Gagneaux,  
Sidney F. Galvin,  
Frank T. Gartside,  
Robb Gover,  
William S. Graham,  
Theodore W. Hacker,  
William J. Heimiller,  
Karl J. Heineman,  
J. Wilbur Heisse,  
Carl H. Horn,  
Edgar M. Iglehart,

Abraham N. Krieger,  
Eugene B. Link,  
Raymond T. Long,  
A. Craig Meikle,  
Charles A. Mengers,  
Rudolph Michel,  
William H. Munroe,  
Alfred S. Niles, Jr.,  
Charles E. Osenburg, Jr.,  
Raymond C. Parlett,  
Edward S. Poole,  
Gustav A. Rasch,  
James J. Riley,  
Henry H. Roschen,  
William H. Sandlas,  
A. Albert Schad,  
Lester A. Schloss,  
Eric E. Schmeid,  
Howard J. Schuster,  
John A. Sternberg,  
E. Raimon Stivers,  
Edwin M. Talbot,  
Edward J. Thomas,  
Frederick C. Traub,  
Oliver Travers,  
J. Leonard Walsh,  
H. Sigurd Walter,  
Rowe C. Ward,  
Charles B. Watkins,  
James S. Webb,  
Ormsby P. Webster  
Reuben Wisthoff  
T. Robey Wolfe,  
Ernest C. Zchheuschler.

## MID-YEAR CLASS OF '13

Abram F. Bachrach,	Harry Korff,
Lawrence A. Baldwin,	Benjamin Lasinsky,
J. Carroll Bartholow,	L. T. Lenderking, Jr.,
Carlyle E. Boone,	Francis Lentz,
Leigh H. Brodie,	Julius Levine,
Earl A. Constam,	Frank Lucke,
Hyman A. Danzig,	Paul B. Milburn,
E. Stanley Davis,	R. W. Moore, Jr.,
Elmer J. Elgert,	Carroll F. Morrison,
Curtis L. Garrett,	Clifton Pruett,
Edward A. Hampson,	Charles L. Pumphrey,
John N. Heiner,	Milton Smith,
Walter Hess,	Bernard J. Trantman
James Hopkins,	Spencer Unglaub,
Isadore Isaacs,	C. H. Walker,
E. E. Kaiser,	William F. Walker, Jr.,
Laurence C. Kasper,	William E. Wood.
Williab J. Kellinger,	

## CLASS OF '13

- William T. Abercrombie,  
Lloyd W. Ashley,  
R. Kenneth Barnes,  
C. Rawlings Beaumont,  
Charles A. Becker,  
Milton J. Boyer,  
A. Clifford Carlton,  
Frank H. Carter,  
Soloman Cohen,  
Harry A. Collett,  
Laurence E. Collins,  
Parlett Davis,  
Clarence Earle,  
George F. Gephart,  
Lawrence F. Gilpatrick,  
Benjamin Goldberg,  
Harry A. Goldberg,  
William McL. Graham,  
Charles H. Grauling,  
Robert Tyson Greer,  
Charles F. Gross,  
Robert F. Gunts,  
George K. Haderman,  
Otto H. Hamm,  
Walter H. Harrison,  
William Heaphy,  
Carl A. Heckmer,  
Clarence Heisse,  
Robert Hicks,  
John B. Hill,  
Irving Hoffman,  
Ira L. Houghton,  
Stedman Houghton,  
Elmer H. Johnson,  
Kendrick Kelly,  
William F. Kuehle,  
William F. Leineweber,  
Jacob Levin,  
Alfred C. Lewis,  
J. Wardale McAllister,  
Arthur S. McCabe,  
Cyril Markley,  
Louis Meyerhoff,  
W. T. Meushaw,  
Harry Miller,  
L. W. Miller,  
William H. Osborn,  
Vincent Panettiere,  
Isaac Poloway,  
Oden B. Pyle,  
Allen J. Quinan,  
Reinaldo Ramirez,  
Milton Reiner,  
Frank G. Reinhart,  
Lawrence T. Reinicker,  
Elmer C. Reynolds,  
Leslie Sebald,  
John J. Siedel,  
Robert W. Sheckells,  
Walter Simon,  
Carroll T. Sinclair,  
Jacob Sindler,  
S. LeRoy Thomas,  
Ernest Tschudy,  
Herman Wacker,  
W. Norman Wherrett,  
W. H. Wilhelm,  
John A. Williams,  
W. Clarke Wroe,  
Howard E. Zieffle.

## MID-YEAR CLASS OF '14

M. Albert Armstrong,	Edgar A. Muller.
Wilbur E. Benfer,	J. Owings Preston,
Edwin C. Clayton,	Robert A. Reitz,
Hugh Walter Day,	Henry P. Rogers.
H. Crawford Emich,	V. Vyant Radavich,
Reardon Fusselbaugh,	Benjamin Schloss,
Spencer R. Hall,	Arthur T. Spies,
Maurice M. Heimiller,	James M. S. Waller,
Charles A. Hiss,	Louis Weissing,
Alexander Klitch,	James H. Woodal,
Harvey F. McLaughlin,	Edwin C. Yearly.

## CLASS OF '14

Alphonso Alcarese,  
F. Gloyd, Awalt,  
John R. Bangs, Jr.,  
Gordon K. Bishop,  
Warren C. Black,  
Ralph A. Bloomburg,  
Charles E. Bristor,  
Charles W. Burns,  
Frank A. Cesky,  
Walton B. Childs,  
Milton M. Constam,  
George C. Coursey,  
Frank Crist,  
Kenneth S. Cullom,  
Ryland N. Dempster,  
Brant S. Derr,  
C. Rothwell Ditman,  
Walter L. Edel,  
Frank O. Ewell,  
Leonard C. Fleischman,  
Charles Fox,  
Stanley P. Freeman,  
Harry Greenberg,  
Thomas H. Hardinge,  
George D. Harman,  
Donald C. Hennick,  
Charles E. Hoffman,  
Harold O. Hogan,  
Stanley L. Howard,  
Frank R. Isaac,  
J. Wilbur Kemp,  
Emanuel Kohner,  
Joseph L. Krieger,  
George E. Lang, Jr.,  
Peter A. Lapetina,  
William R. Lawrence,  
Otto C. Linhardt,  
J. Maynard Linthicum,  
John K. Mealy,  
J. Levering Merritt,  
Paul Messersmith,  
H. Osborne Michael,  
Robert Milhiser,  
William B. Mosher,  
Cecil H. Mullikin,  
Frank Nitzberg,  
James E. Poehlman,  
Augustus R. Price,  
John Wade Rice,  
William H. Sarbacher,  
Theodore G. Schad,  
Henry R. Schmidt,  
William F. Schwartz,  
John H. Seipple,  
Nathan Shillman,  
Eli Silberstein,  
Harold Sloman,  
Raymond D. Spencer,  
Edwin A. Steinwedel,  
Lawrence C. Stoudemire,  
Peyton B. Strobel,  
Harry Talkin,  
R. Corbin Taylor,  
Daniel W. Tilman,  
Charles W. Trigg,  
Herman A. Von Eiff,  
H. Clay Ward,  
Wilbur F. Ward, Jr.,  
Clarence H. Weant,  
Walter E. Weeks,  
Kenneth F. Whitcomb,  
Paul A. Wilhide,  
Vance Vernon Wilson,  
Sndney N. Young,  
E. Carl Young,  
Emmett F. Zimmerman.

## MID-YEAR CLASS OF '15

Albert C. Adams,  
John O. Benson,  
Ralph Brever,  
William G. Burnsall,  
Stanley S. Cromwell,  
John S. Dempster,  
David L. Elliott,  
James M. Gillespie,  
Howard Heinmiller,  
H. Lee Hoffman,  
William B. Hoke,  
Temple Joyce,

Robert M. Kaufholz,  
H. Irvin Kellner,  
Paul B. Kelly,  
Edward Klawans,  
Benjamin A. Krotee,  
E. Hall Neavitt,  
William C. Patzschke,  
Raymond S. Pfeifer,  
Jenkins A. Robinson,  
Clarence V. Wherley,  
Rogers C. Whiteman,  
J. Edwin Wrenn.

## CLASS OF '15

William Jesse Armiger,  
Donald D. Ballard,  
Robert L. Bauernschmidt,  
Kenneth O. Bitter,  
Henry J. Bittorf,  
Herbert Blaustein,  
Charles J. Blazek,  
Christian Braun,  
Harry J. Burgess,  
George W. Carmichael,  
Vernon Collison,  
Henry L. Constam,  
William F. Crawford,  
Harry H. Dietz,  
William E. Duck,  
Fred. Eisenbrandt,  
William L. Eisert,  
Frank Elsnic,  
Charles F. Erck,  
Walther H. Feldmann,  
Edward F. Fredl,  
Alfred W. Glaser,  
Morris Glick,  
Frederick Green,  
Isaac Greenbaum,  
Sidney Greenwald,  
William L. Hampsher,  
J. Ray Hardin,  
Crawford R. Haskell,  
Lee C. Haskell,  
Harry E. Hauer,  
Carl C. Hauswald,  
Harry Heuisler,  
Preston Hipsley,  
Urban S. Holden,  
Edwin W. Horlebein,  
James Hunt,  
W. Irvin Jackson,  
Norman Joyner,  
Thomas G. Kemler,  
Gustav W. Klemm,  
Frank Klunk,  
Carl L. Knabe,  
Frederick Knoop.

William F. Krug, Jr.,  
John H. Lampe,  
G. August Laux,  
Wallace Lawrence,  
William E. Lehr,  
Edward L. Longley,  
Cornelius McAuliffe,  
Charles E. McQuinn,  
Herbert K. Morrison,  
Frank Novak,  
George E. O'Neill,  
Maurice Oppenheim,  
Edward T. Petrick,  
Rudolph Pfaff,  
Kunibert Picker,  
Eli Pivarnick,  
Charles R. Preston,  
Henry L. Prince, Jr.,  
George Ross Rede,  
John Reimer,  
Joseph Rohowski, Jr.,  
Jacob S. Rosenthal,  
Benjamin S. Sabsewitz,  
Carl L. Schmidt,  
Charles O. Schobel,  
Raymond Sheely,  
Harry F. Shew, Jr.,  
Charles G. Smith,  
Henry H. Startzman,  
John A. Stokes,  
Albert L. Struven,  
Lindner T. Summers,  
James S. Thayer,  
Lawrence Thompson,  
Wilson C. Warren,  
Murray G. Waters,  
Joseph Weil,  
Raymond M. Welsh,  
Walter B. Wessels,  
Herbert E. White,  
Morton S. Whitehill,  
Herman Wolf,  
H. Paul Zieffle.

**MID-YEAR CLASS OF '16**

Arthur J. Adams,  
Rankhard F. Baer,  
Russell G. Bishop,  
Kent D. Currie,  
Frank C. Dehler,  
Henry G. Erck,  
Max Esterson,  
Isidore Finkelstein,  
C. Frank Gier, Jr.,  
David Goldstein,  
Joseph Greenspun,  
LeRoy Y. Haile,  
Arthur W. Hollstein,  
Maurice J. Keese,

Bernard Lutzky,  
Herbert B. McGinnis,  
Leonard C. Moltz,  
R. Wornom Neale,  
William P. Pearson,  
Alan Davis Price,  
Russell M. Rhode,  
Richard Schimmel,  
L. Wilson Sellman,  
Wm. Howry Slasman,  
William L. Stewart,  
F. Howard Townsend,  
Jasper F. Walter,  
Samuel L. Weinberg,

## CLASS OF '16

C. Walter Alvey,  
E. Albert Anger,  
Frank Appelstein,  
Eli Baker,  
Harold D. Baker,  
W. Leonard Bentz,  
Max Berlin,  
T. Morris Berry,  
Norman J. Betz,  
Frank E. Black,  
Harry E. Bloomsburg,  
John Kirk Bolte,  
J. Wesley Bowen, Jr.,  
Russell K. Burner,  
A. King Calder,  
Louis L. Cassard,  
William Dood Cook,  
J. Edgar Countess, Jr.,  
Marvin M. Crout,  
R. Lester Culer,  
Curtis F. Davis,  
S. Bernard Doyle,  
C. Frederick Dreyer,  
Francis W. Erdman,  
Stanley H. Faupel,  
Charles J. Fekl,  
Charles M. Fitzpatrick,  
Carroll L. Foreman,  
Franklin D. Fulton,  
Robert S. Hall,  
Richard W. Hambleton,  
George M. Hampson,  
Leslie H. Hess,  
Richard B. Holmes,  
Thomas F. Hubbard,  
John L. Hunt,  
W. Chesney Ingham,  
J. Carey Jennings,  
Arthur L. Jackson, Jr.,  
John A. James,  
Felix Jasper,

Edward C. Johnson,  
Louis B. Johnson,  
Harry Kairys,  
Raymond C. Kellner,  
William C. Kidd, Jr.,  
Anderw H. Knecht,  
Roland H. Lamb,  
Valentine W. Lentz,  
Louis Lipschutz,  
George R. McDonald,  
Ralph E. McShane,  
Wm. Lee Merriken,  
Harold F. Miller,  
William R. Miller,  
Evans A. Mullan,  
John J. O'Keefe,  
Stephen W. Orne,  
Louis Platt,  
G. Irvin Poehlman,  
Albert E. Pohmer,  
Emory C. Rice,  
Henry F. Rinn,  
T. Harry Roebuck,  
Samuel Rosenblatt,  
Benjamin Rosenfeld,  
Ernest H. Salter,  
John L. Sebald,  
Arthur H. Senner,  
S. Joseph Shamberger,  
Nathan Shpritz,  
Samuel Silberstein,  
Walter P. Sinclair,  
William A. Smith, Jr.,  
David B. Sonneborn,  
Edward F. Strasser,  
Albert G. Stumptner,  
George G. Talbott,  
Arthur W. Taylor,  
William C. Thayer,  
R. Haughton Tilghman,  
William Kyle Upton,

CLASS OF '16—*Continued.*

J. Kennedy Vickers, Jr.,	Carroll E. Williams,
William H. Walker,	Charles F. Willis,
J. Wilbur Watkins,	Christian Wohlgemuth, Jr.,
Francis Weaver,	Robert Earle Woodal,
Francis A. Weiskittle,	D. Emory Wooden,
Clifton K. Wells, Jr.,	Sumner B. Wright,
George J. Wheeler,	Nelson C. Young,

## MID-YEAR CLASS OF '17

M. DeKalb Clark,  
E. Alvan Eberley,  
Carl E. Ficht,  
J. Edwin Fissel,  
Wilmer F. Garrett,  
Leon J. Greenbaum,  
W. Garland Gressitt,  
C. E. St. Elmo Grice,  
Richard H. Grubbs,  
Frank W. Herring,  
Werner William Kern,  
Herman Kratz, Jr.,  
William D. Lauten,  
J. Roland McComas,  
J. Donald Meikle,  
Henry C. Mohlhenrich,  
H. Rodney Mole,

Edwin E. Murray,  
Herman Neiman,  
Edmund R. Paige,  
Albert B. Parsons,  
John V. Pohlman,  
Paul G. Reier,  
Aurelio T. Schiaffino,  
Joseph Tumbler,  
Webster T. Turner,  
Walter H. Vernay,  
Herbert W. Wagner,  
Charles W. Walter,  
John J. Wanicek,  
Louis Weil,  
Henry F. Wiesner, Jr.,  
J. Norman Wright,  
F. Elmer Young.

## CLASS OF '17

William Edward Amick,  
Charles D. Anderson,  
K. H. Andrae,  
E. Stanley Ault,  
Foster N. Baker,  
Thomas H. Barrow,  
LeRoy B. Baughman,  
Frank J. Baumann,  
Edward M. Bavis,  
Thomas L. Berry, Jr.  
Solomon Bichow,  
Harry W. Buddemeier,  
Irvin T. Baker,  
Wilmot C. Ball,  
G. LeRoy Chenoweth,  
Charles H. Cleary,  
Howard E. Colliflower,  
Albert Earl Courts,  
A. Woodland Cover,  
Carl E. Cummings,  
Harold M. Cummins,  
Richard S. Diehl,  
Aaron Eisenberg,  
Alexander E. Eisenbrandt,  
Irving M. Elliott,  
Charles W. Fairbank,  
Samuel Faraci,  
Abraham Finkelstein,  
Norman Freedman,  
Alan L. Gordon,  
Charles V. Gordon,  
Harry Gordon,  
Eugene E. Grossman,  
Roger F. Hall,  
C. Bertrand Hand,  
Joseph M. Harrison, Jr.,  
Solomon Hoffman,  
J. Walker Hopkins,  
P. Naylor Israel,  
Arthur V. L. James,  
Frederick L. Kahmer,  
William Kaufholz,  
George W. Keen,

Louis H. Klass,  
George A. Knipp,  
L. Robert Kollmeyer,  
Hyman Kramer,  
Ephraim Kuff,  
J. Earl Laughlin,  
George H. E. Leithauser,  
Frederick A. Leslie,  
Abraham Z. Levy,  
W. Lyttleton McCaghey,  
J. Lister McElfresh,  
W. Aubrey Maccubbin,  
J. Wesley Mahaney,  
Maurice A. Michel,  
Alexander Mitchell,  
Randolph R. Mohlhenrich,  
Philip F. Morgereth,  
Harry Morrison,  
Howell B. Mullikin,  
A. Joseph Parker,  
A. William Parker,  
George T. Phillips, Jr.,  
Edgar G. Platt,  
Homer M. Pritchett,  
Daniel G. Raffel,  
Lester Henry Reineke,  
Robert L. Riddlemoser,  
T. Norris Ridgaway,  
Marcus Sagal,  
J. Norman Scheer,  
Samuel M. Silberstein,  
Abraham Silesky,  
Albert Van Deaver Smith,  
Louis Smith,  
C. Elwood Smyrk,  
J. Cornelius Spedden,  
H. Leary Taylor,  
James L. Tobin,  
Frederick F. Torsch,  
Jerome B. Trout,  
Francis V. Ulrich,  
Warren Viessman,  
Guilford W. Vogt,

CLASS OF '17—*Continued.*

August H. Wagener,  
Robert B. Watson,  
P. Norris Wells,  
Joseph A. Wensk,  
Charles R. West,

H. Ford Wheeden,  
G. Hayes Whitehouse,  
John Philip Wilhelm,  
Elmer P. Wimmer,  
Charles E. Zeman,

## MID-YEAR CLASS OF '18

Alfred E. Baer,  
Benjamin L. Berman,  
Eugene A. Bond,  
J. Gordon Bowen,  
Charles Holmes Boyd,  
LeRoy Brundick,  
Melvin Roy Cabe,  
Michael Cohn,  
Anthony F. DiDomenico,  
Arthur C. Earp,  
Leon Edelson,  
Lawrence L. Evert,  
Harry F. Fenneman,  
Harold L. Furst,  
Bennett Gallagher,  
Eugene Gordon,  
J. Sylvester Harper,

Louis P. Henninghausen,  
G. Vernon Hobbs,  
Carl P. Kaufman,  
Joseph J. Kelley, Jr.,  
Robert S. Leland,  
Rudolph H. Lucke,  
James St. Clair Martenet,  
Wm. Edmunds Reins,  
George J. Roche  
Charles Irvin Schad,  
Melvin E. Scheidt,  
Frederick J. Sendelbach,  
Joseph C. Shaftel,  
Franklin C. Shelley,  
Julian S. Webb,  
Robert D. Zimmerman,

## CLASS OF '18

- Isidore Aaronson,  
Henry Adler,  
Ralph O. Barnett,  
Harold T. Barr,  
Conrad A. Bergler,  
Schuyler C. Blackburn,  
A. Lyle Bolton,  
Rowland L. Bortner,  
Harold Breslau,  
Charles A. Cassell,  
William R. Childs,  
William Clisham, Jr.,  
Calvin E. Cohen,  
Wilbur H. Collier,  
C. Page Comegys,  
Lewis G. Coscia,  
Carl Day,  
Louis J. Dembo,  
Allan R. Dixon,  
Leroy A. Droscher,  
Wm. Henry Durmonnd,  
Benjamin Eisenberg,  
Emil Wm. Elsnic,  
Charles S. Fiske,  
Gordon Fitzgerald,  
W. Irving Fitzgerald,  
Abraham Fleischer,  
Richard B. Fulton,  
Samuel Gordon,  
W. Laurence Gosnell,  
Henry R. Granger,  
R. Waldo Hambleton,  
Stanley H. Hays,  
Solomon Hecker,  
J. Zachariah Heskett,  
J. Lawrence Hildebrandt,  
Millard F. Hiltner,  
Abraham Hurwitz,  
Calvin Hyman,  
William H. Jolly,  
Samuel Katz,  
Warren F. Kehs,  
T. Edward Kesting,  
Charles G. Klingerhoefer,  
William F. Krause,  
Paul E. Laferty,  
Richard A. Lee,  
Willard M. Lee,  
Kenneth V. Libhart,  
James T. Lowes,  
H. Randolph Maddox,  
William F. Mahon, Jr.,  
William S. Mangold,  
Philip Margolin,  
Joseph J. Meyer,  
Hugh Miller,  
Melvin L. Moritz,  
Louis D. Mortillaro,  
Anton S. Muessen,  
John E. Mugford,  
Robert D. Mugford,  
Fred. E. Mutter,  
William K. Nicholson,  
Robert A. Norris,  
F. Arthur Oehm,  
William D. O'Keefe,  
Charles Howard Parrish, Jr.,  
Albert M. Paulus,  
Henry A. Plisetsky,  
John W. Pumphrey,  
Joseph H. Punte,  
Robert M. Raith,  
James R. Reed,  
Charles L. Rohde,  
David Rosenthal,  
J. Donald Rubie,  
Walter Rupp,  
Anthony J. Sakievich,  
Kurt A. Schneider,  
Howard A. Schnepfe,  
Alfred B. Scott,  
Frank M. Shamback,  
Arthur Shapiro,  
Edward C. Smith,  
William E. Snyder,  
Frank J. Stanek,

CLASS OF '18—*Continued.*

August Stiegler,	Henry Weisberg,
Frank G. Taubenheim,	Brent Wells,
Joel M. Teichman,	Brent Wells,
Magruder F. Tongue,	Andrew M. White,
Philip Wagner,	Robert R. Whittington,
Fred. P. Walden,	Harold A. Whittle,
Robert R. Walden,	Ralph D. Dillis,
David Weintraub,	George Yaniger.

## MID-YEAR CLASS OF '19

- William Van Wert Amig,  
George Ashman,  
Robert F. Ballard,  
Jack Wm. B. Ballenger,  
John Henry Barron, Jr.,  
Arthur W. P. Blohm,  
H. Gassaway Brown, Jr.,  
Arthur C. Bushey,  
Irvin M. Cook,  
George F. Dederer, Jr.,  
W. Rigeley Edwards, Jr.,  
Wm. H. Englehardt,  
Bernard Feinberg,  
Wm. N. Fischer,  
Benjamin R. Fisher,  
Alfred B. Geer,  
Samuel R. Goldberg,  
Frank M. Herring,  
H. Ensor Hubbard,  
Edward H. Ireland,  
Jacob Klotzman,  
Peter T. Nnapp,  
Samuel R. Lachman,  
Morton W. Lieberman,  
Malcolm Roderick Logan,  
John McDairmant,  
David N. Meyer,  
Robert F. Milligan,  
John N. Paulus,  
Kenneth W. Paxton,  
James S. Shank,  
Quentin D. Singewald,  
Charles F. Swyser,  
Samuel Spintman,  
Thomas B. Street,  
Samuel M. Weinberg,  
Adolph C. Wienert,  
Albert B. Williams,  
Harry B. Yeager,  
Clarence T. Adams,  
Robert S. Alexander,  
Francis M. Baker, Jr.,  
Carroll R. Benick,  
G. Milton Benson,  
Paul Berman,  
Samuel Bernstein,  
George T. Bertson,  
Clarence H. Bradfield, Jr.,  
David W. Brauer,  
Harry L. Brittain,  
Herman J. Bruckner,  
A. Huntington Burnham,  
Norman F. Burnett,  
Charles Nelson Byrn,  
William John Christopher,  
Gerald W. Cooke,  
Pierce Croner,  
William North Crout,  
William H. Cullimore, 3rd,  
Herbert V. Disney,  
Joseph H. Dugan,  
Warren B. Eckman,  
Milton C. M. Egner,  
Calvern L. Elgert,  
Carroll L. Freeman,  
Frank L. Freeze, Jr.,  
Melvin Fuld,  
Carl Fred. Gail,  
Alan K. Gardner,  
Joseph M. Garvey,  
Herbert Kelcey Gault,  
Charles N. Gerstmyer,  
Cordt R. Goldeisen,  
Maurice J. Goldstein,  
Howard W. Grace,  
James McNeal Graff,  
John J. Gross,  
Louis J. Gruehn,  
N. Rawlins Guthrie, Jr.,  
Bernard C. Hearn,  
William A. Hohlweg,  
James McNab Holloway,  
Howard Arthur Hook,  
Robert Pruett Hooper,  
Jesse Hall Kent,  
Jesse Dallas Kirwan,

MID-YEAR CLASS OF '19—*Continued.*

George Edgar Kohlepp,  
Stanley M. Kriel,  
Bernard Kuder,  
Henry Lazarus,  
Benjamin Levene,  
Meyer David Levin,  
E. Morgan Loane,  
Hamilton L. McCormick,  
George W. Maghamer,  
Herbert J. Mahle,  
Aaron Margolin,  
Walter Melamet,  
Hugo Mele,  
Casimir Miketta, Jr.,  
John Purnell Miller,  
Joseph A. Moran,  
John W. Morrison,  
Leslie H. Nelson,  
Edward C. O'Dell,  
David L. Perlman,  
Bernhardt E. Pielke,  
Clarence H. Pierson,  
Ralph S. Powell,  
William O. Ratcliffe, Jr.,  
Lawrence B. Rice,  
Leon Robinson,  
Proctor S. Rodgers,  
Solomon B. Rosenfeld,  
Charles Joseph Rudel,  
Joseph J. Ryan,  
Thomas J. Ryan,  
Charles G. Sack, Jr.,  
David E. Schuchts,  
Ralph Shepherd,  
Lyold M. Shipley,  
Francis C. Skilling,  
Bernard Roddy Smith,  
Earl Stimson, Jr.,  
L. Burke Stirling,  
John Fred. Strott,  
David D. Thomas, Jr.,  
Joseph C. Thompson, Jr.,  
Robert J. Trautman,  
Henry F. Trinite,  
Owen W. Turpin,  
Ernest St. C. Von Kleeck, Jr.,  
Walter L. Wagner,  
Charles H. Wahman,  
William S. Weikel,  
Charles O. Wherley,  
John L. Wich,  
Calvin H. Yerby,  
Paul I. Young.







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